

NASA Contractor Report 189656, Volume 3

FINAL TECHNICAL REPORT

For

**Support Activities to Maintain SUMS
Flight Readiness**

Contract No. NAS1-17399

**Volume 3 of 9
Attachment B: Flight STS-35 Report
(Section A)**

submitted to

**National Aeronautics and Space Administration
Langley Research Center
Hampton, Virginia 23665-5225**

by

**The University of Texas at Dallas
P.O. Box 830688
Richardson, Texas 75083-0688**

(NASA-CR-189656-Vol-3) SUPPORT ACTIVITIES
TO MAINTAIN SUMS FLIGHT READINESS, VOLUME 3.
ATTACHMENT B: FLIGHT STS-35 REPORT, SECTION
A Final Technical Report (Texas Univ. at
Dallas) 187 p

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**SUMS FINAL REPORT-Contract NAS1-17399
ATTACHMENT B**

Data and Analysis of Flight STS-35

Contents

- Part I Flight Report from STS-35
- Part II Flight STS-35 Report on BET
- Part III SUMS Calibration Data

SUMS FINAL REPORT CONTRACT NAS1-17399

ATTACHMENT B-PART I FLIGHT REPORT FROM STS 35

The Shuttle Upper Atmosphere Mass Spectrometer (SUMS) was flown on Shuttle Flight STS 35 in December 1990. Columbia was launched on December 1, 1990, at Kennedy Space Center (KSC). Sums on orbit operations were performed on December 10, 1990 and entry operation were performed on December 11, 1990. STS 35 landed at Edwards Air Force Base, California on December 11, 1990.

Data reduction from the flight has been performed and is included as follows:

1.0 On ORBIT DATA

- 1.1 PLOT OF SPECTRA, ORBIT**
- 1.2 PRINTOUT OF PEAKS, ORBIT**
- 1.3 PLOTS OF PEAKS, ORBIT**
- 1.4 DETAIL TEST OBJECTIVE**

2.0 ENTRY DATA

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- 2.2 PRINTOUT OF PEAKS, ENTRY**
- 2.3 PLOTS OF PEAKS, ENTRY**
- 2.4 SNAPSHOT CURRENTS, ENTRY**

3.0 HIGH FREQUENCY ENGINEERING DATA

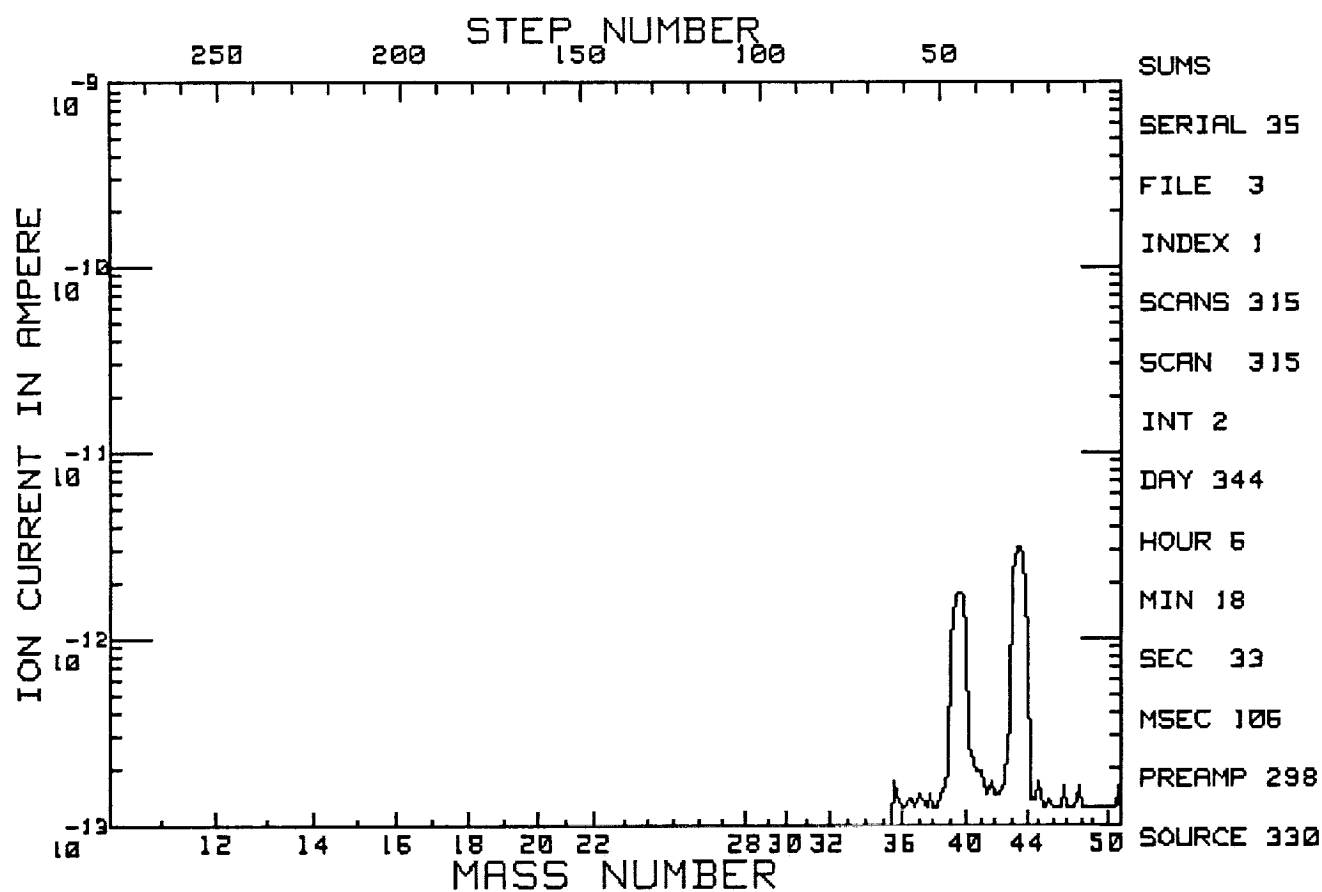
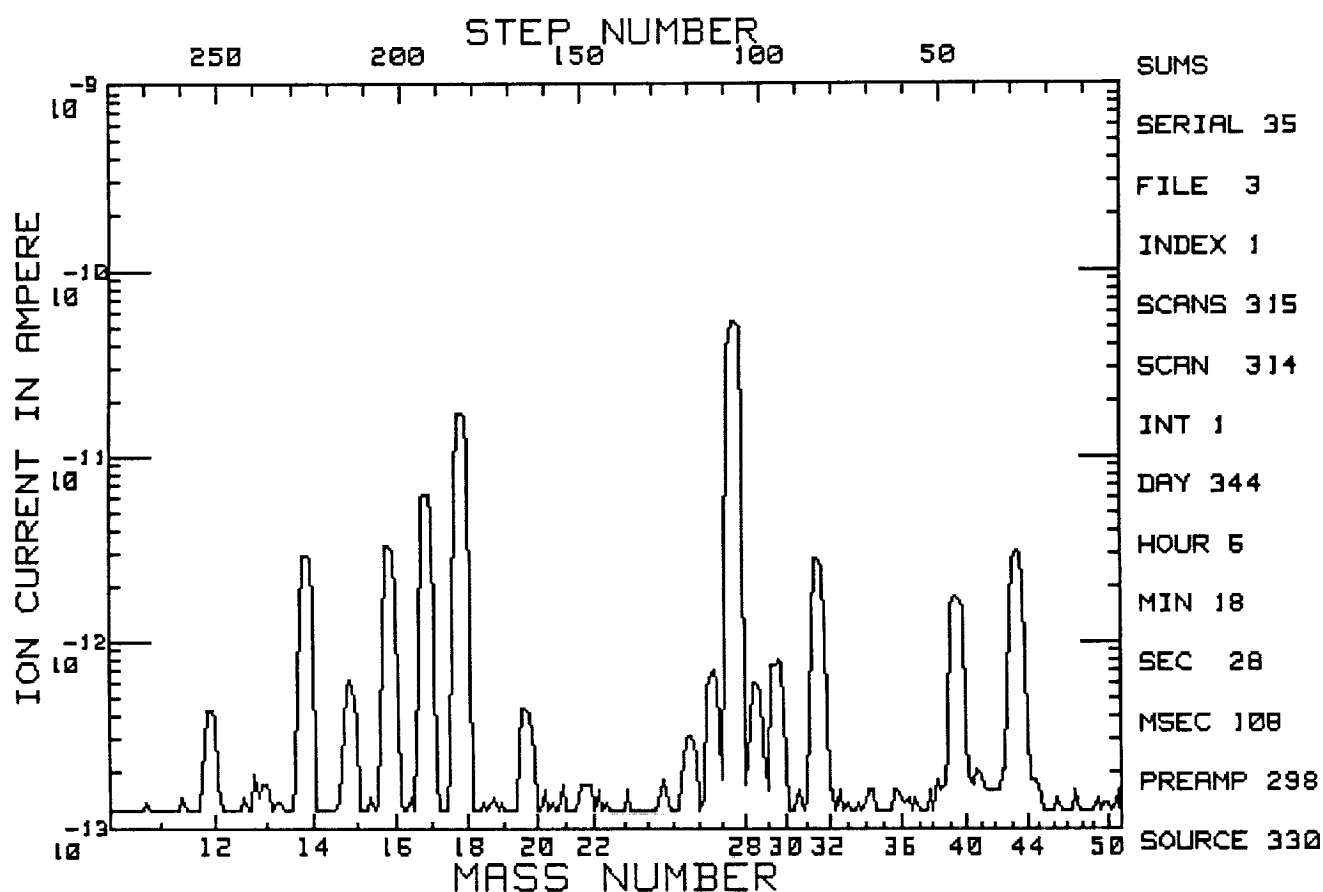
- 3.1 PRINTOUT TIME, ION PUMP, TEMP1, TEMP2, PRESS, TEMP3**
- 3.2 PLOT OF ION PUMP MONITOR**
- 3.3 PLOT OF PRESSURE TRANSDUCER DATA**

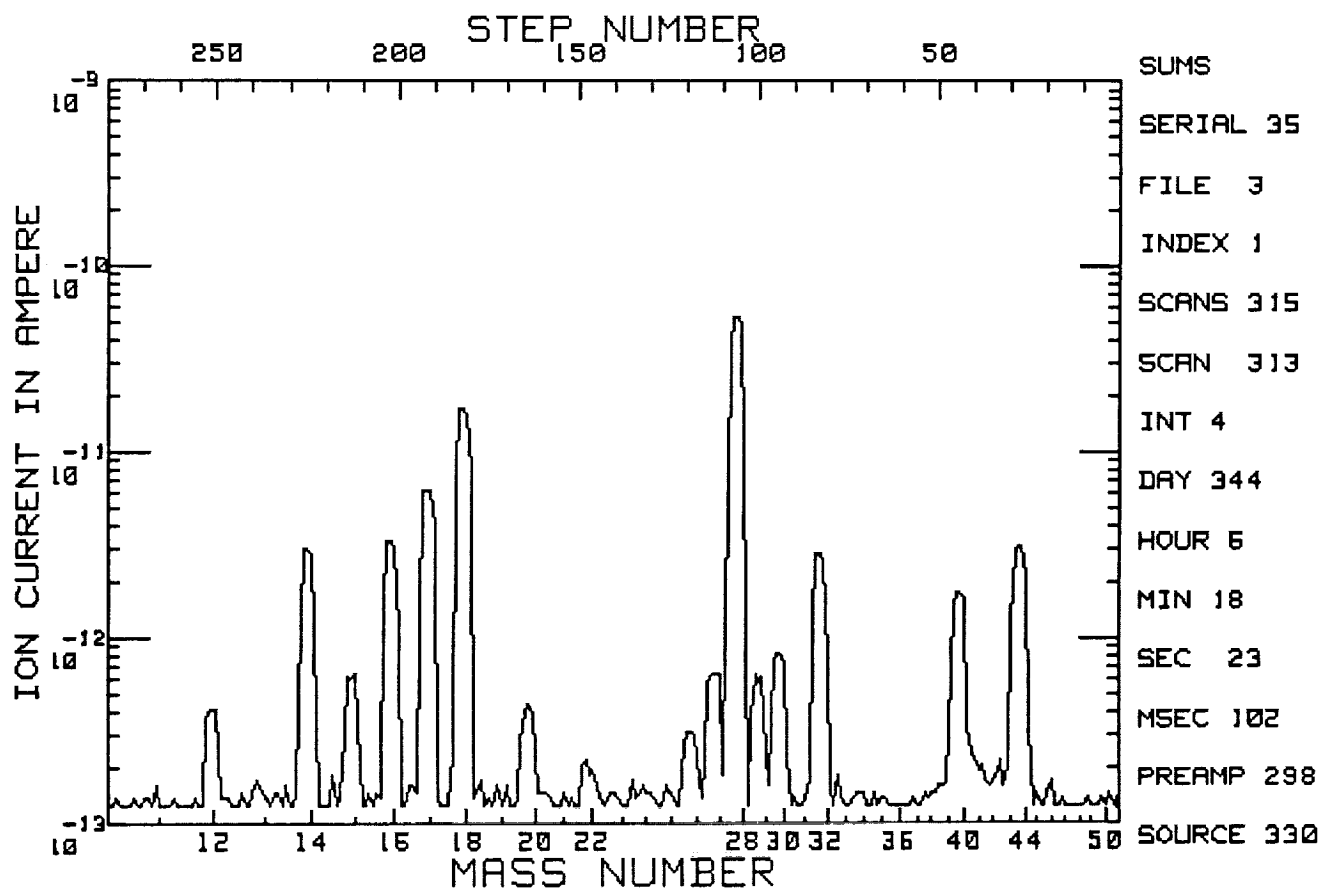
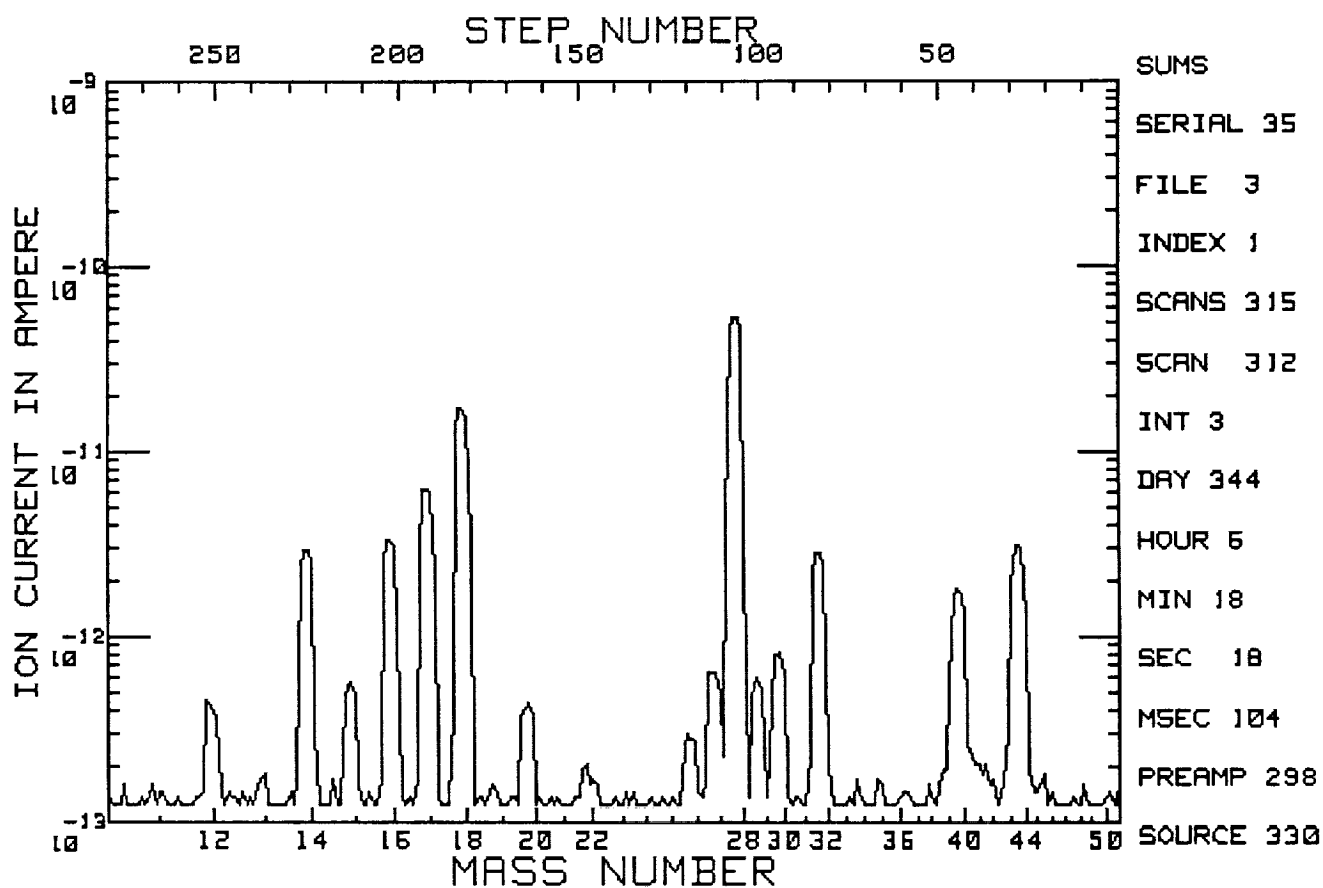
4.0 PRESSURE TRANSDUCERS CALIBRATION

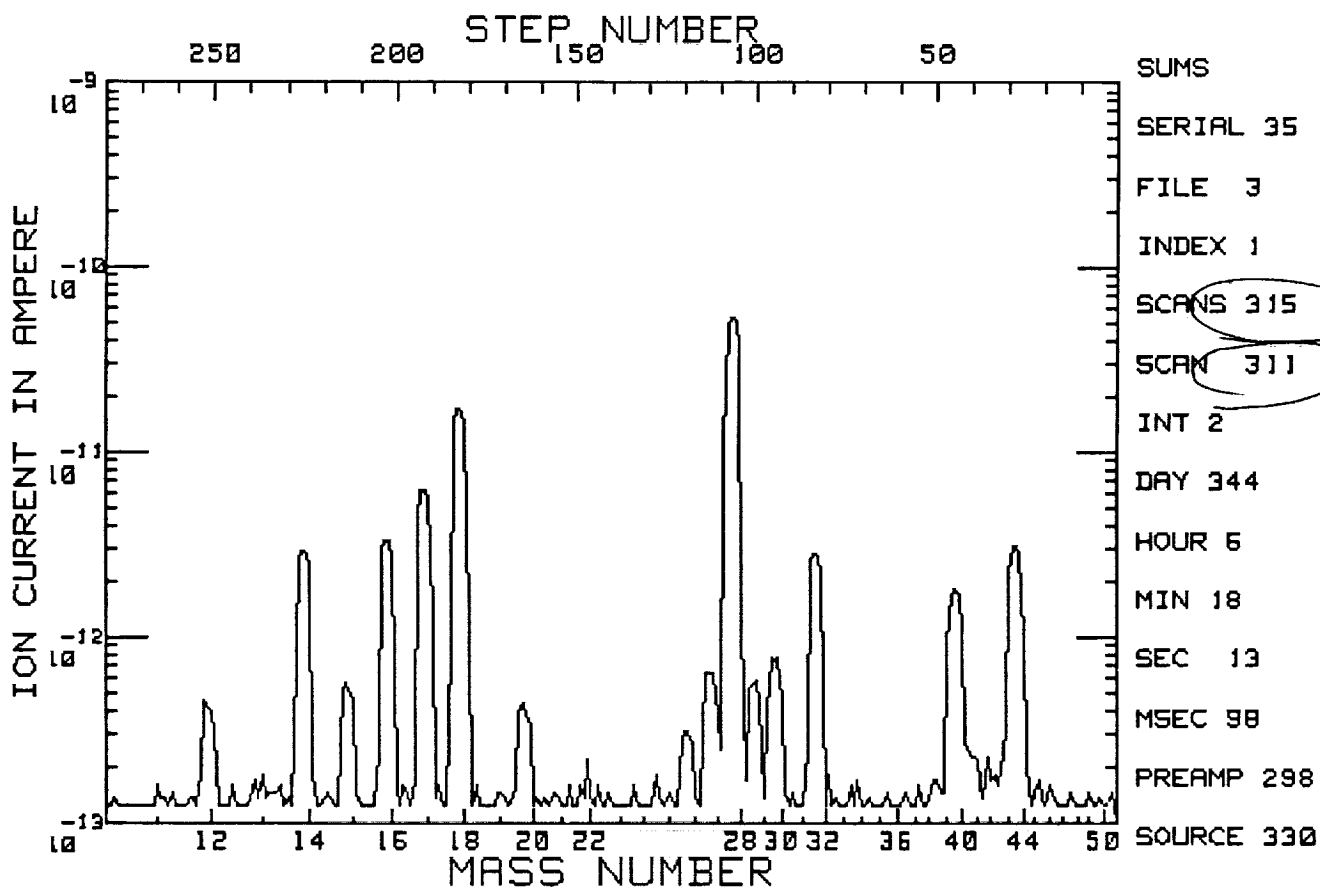
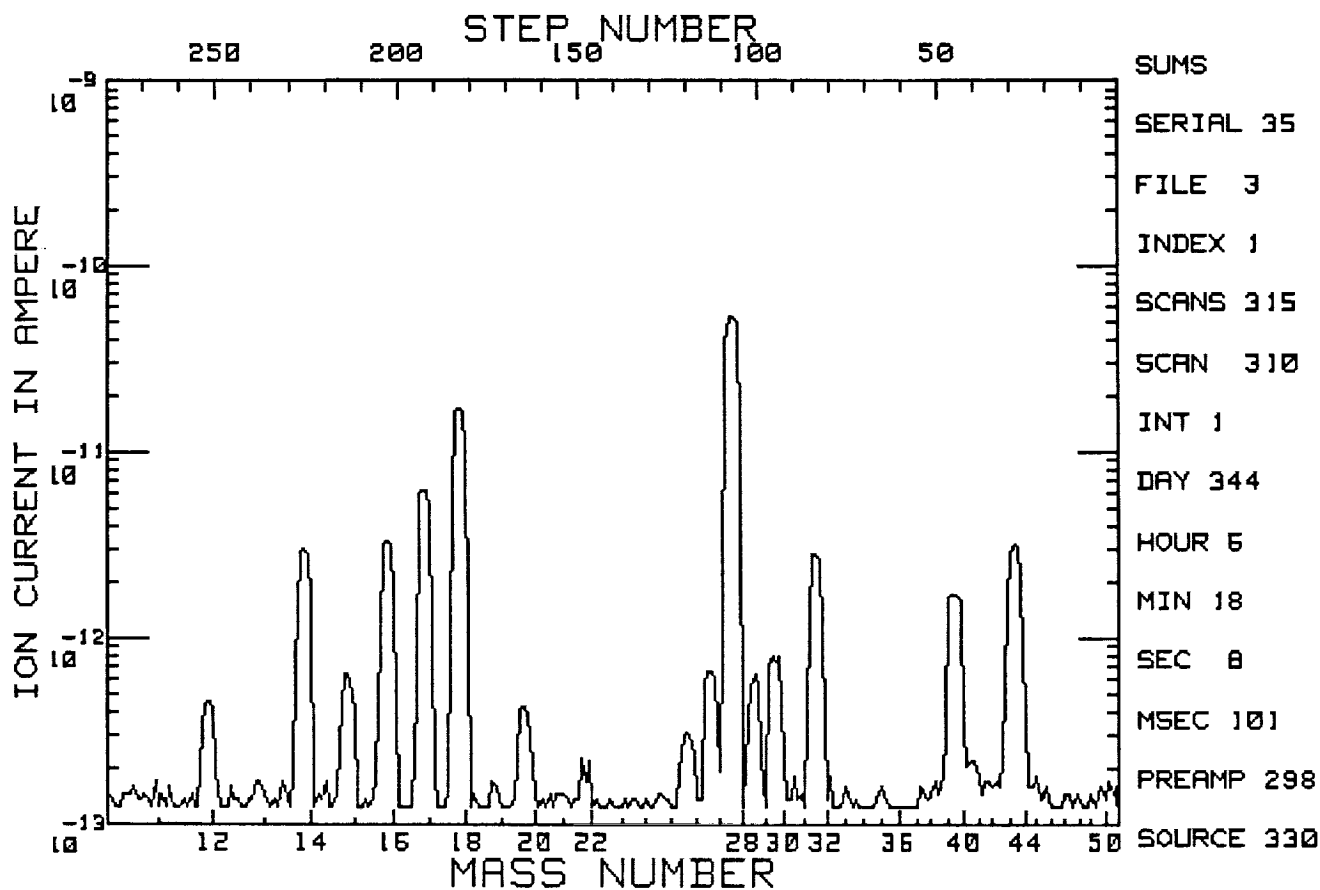
- 4.1 PRINTOUT OF PRESSURE, VOLTS OUT FOR, 1 AND 1.0 PSIA**
- 4.2 PLOT AND CURVE FIT OF DATA**
- 4.3 PLOT OF 0.1 PSIA DATA**
- 4.4 PLOT OF 1.0 PSIA DATA**

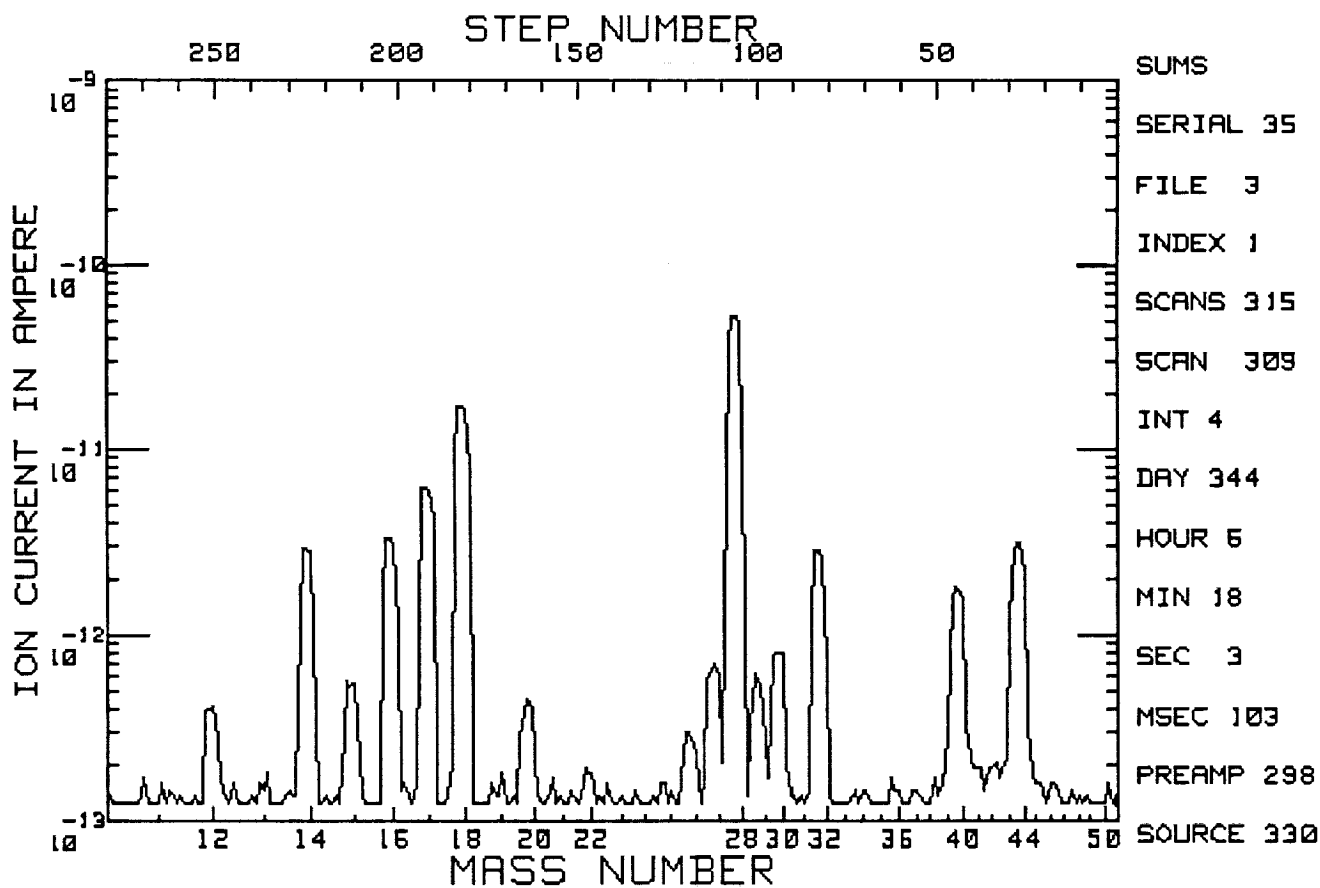
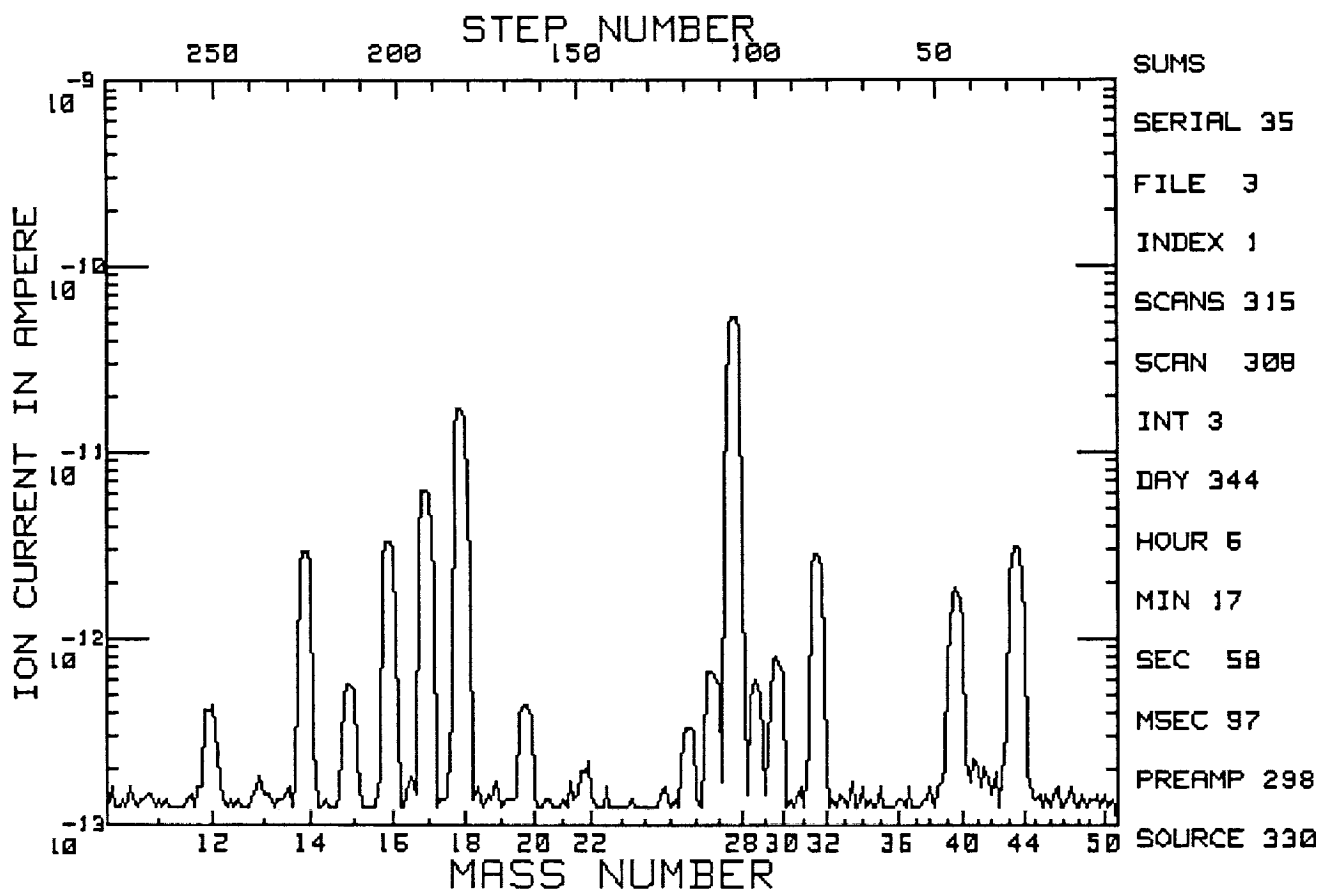
1.0 On Orbit Data

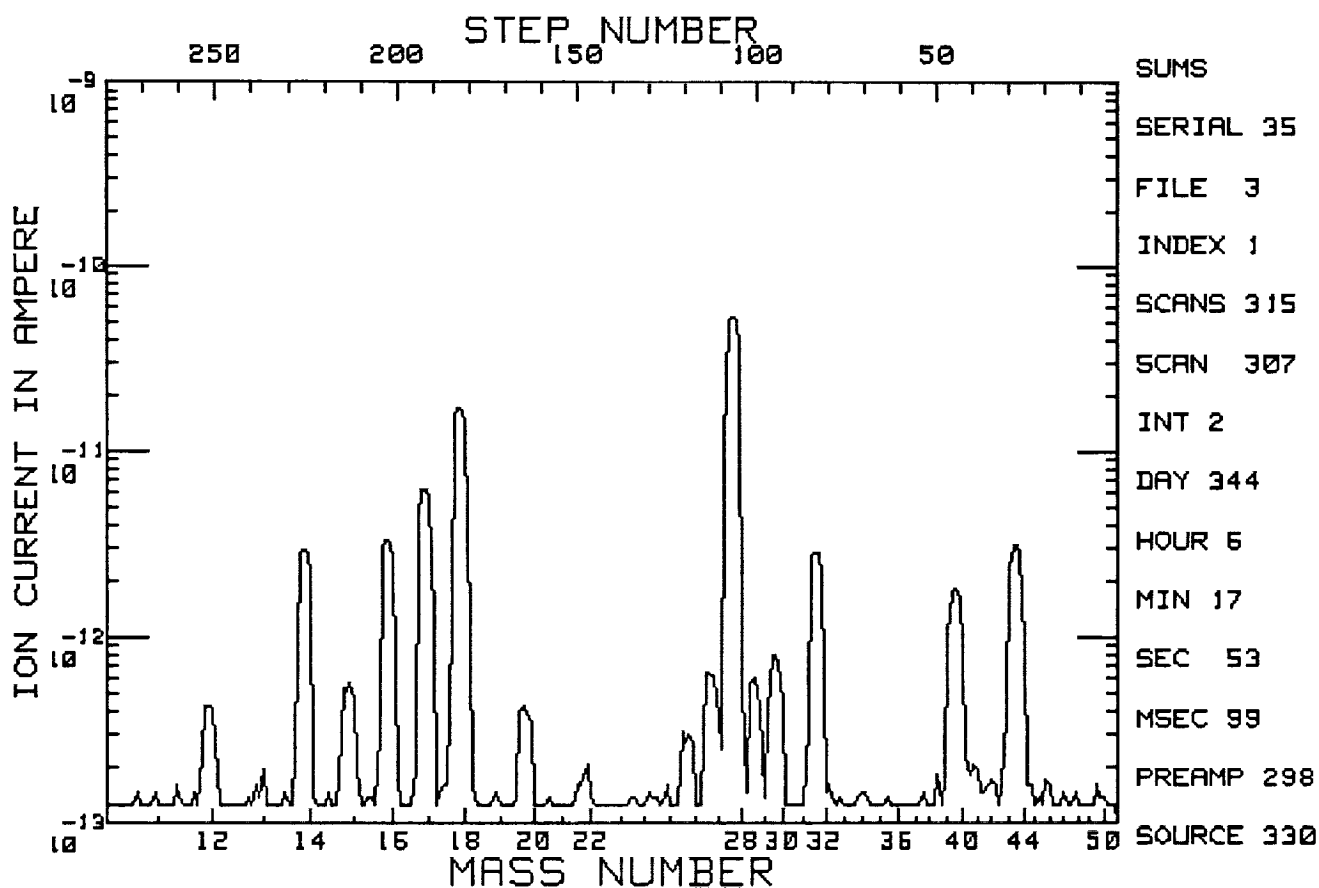
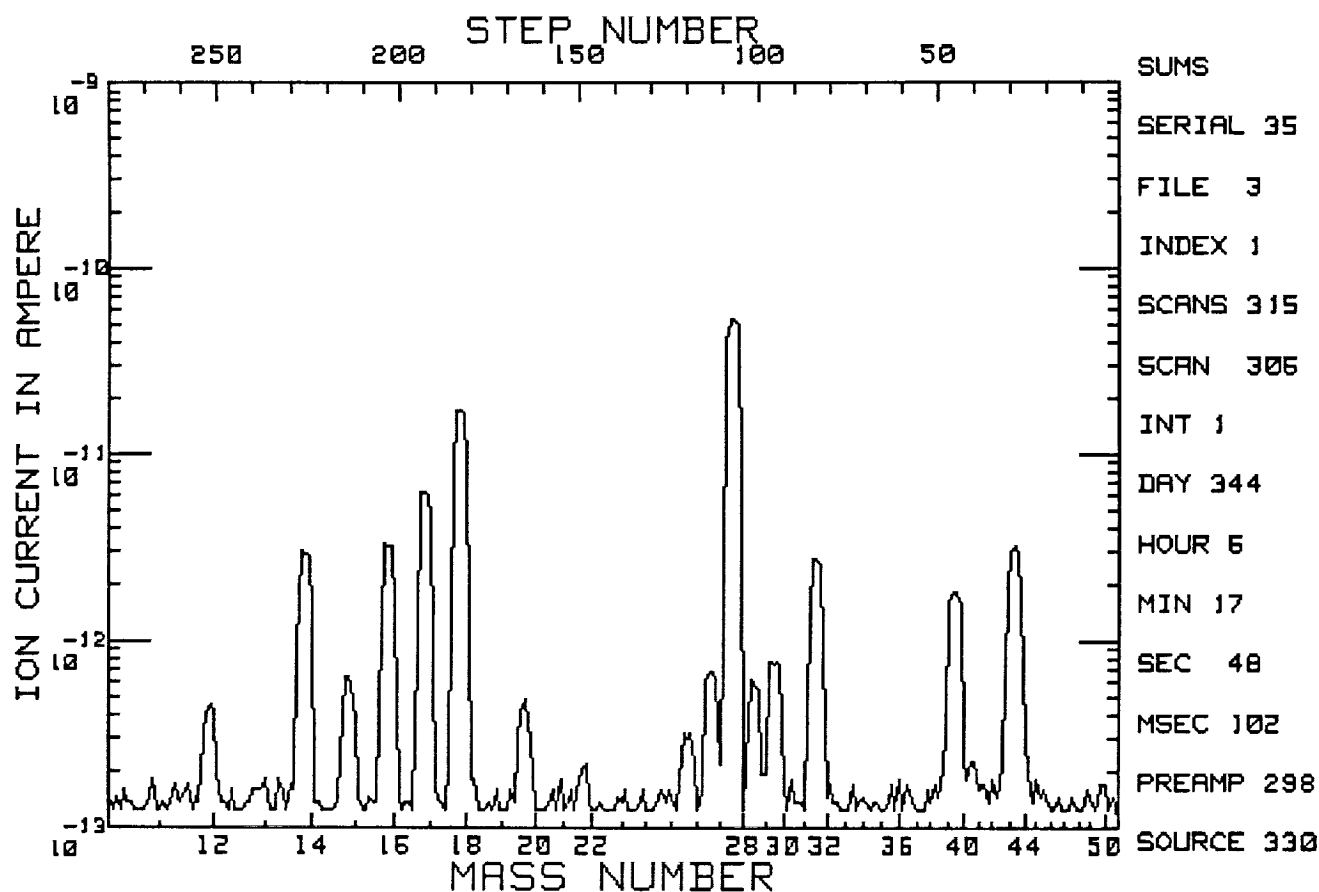
1.1 Plot of Spectra, Orbit

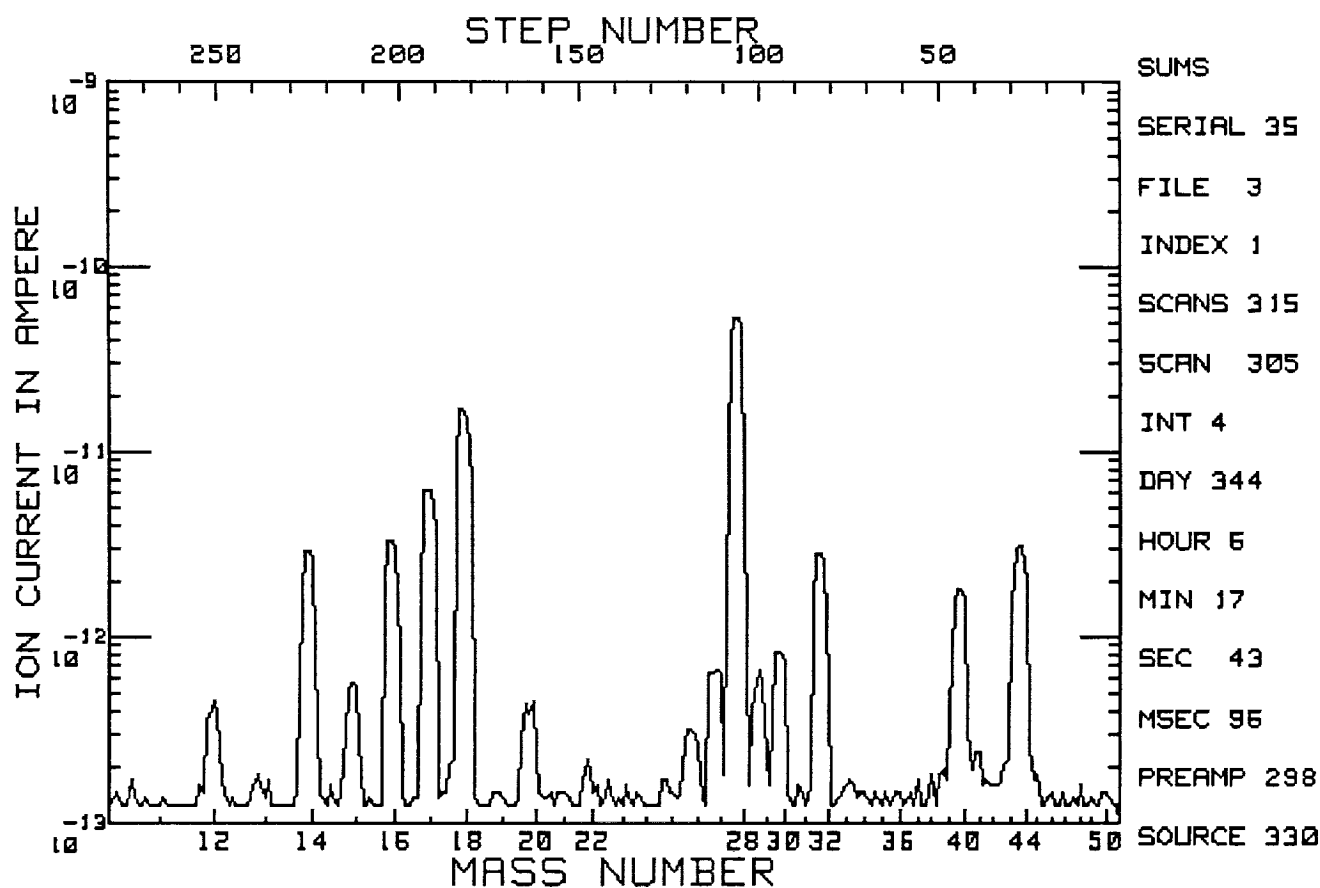
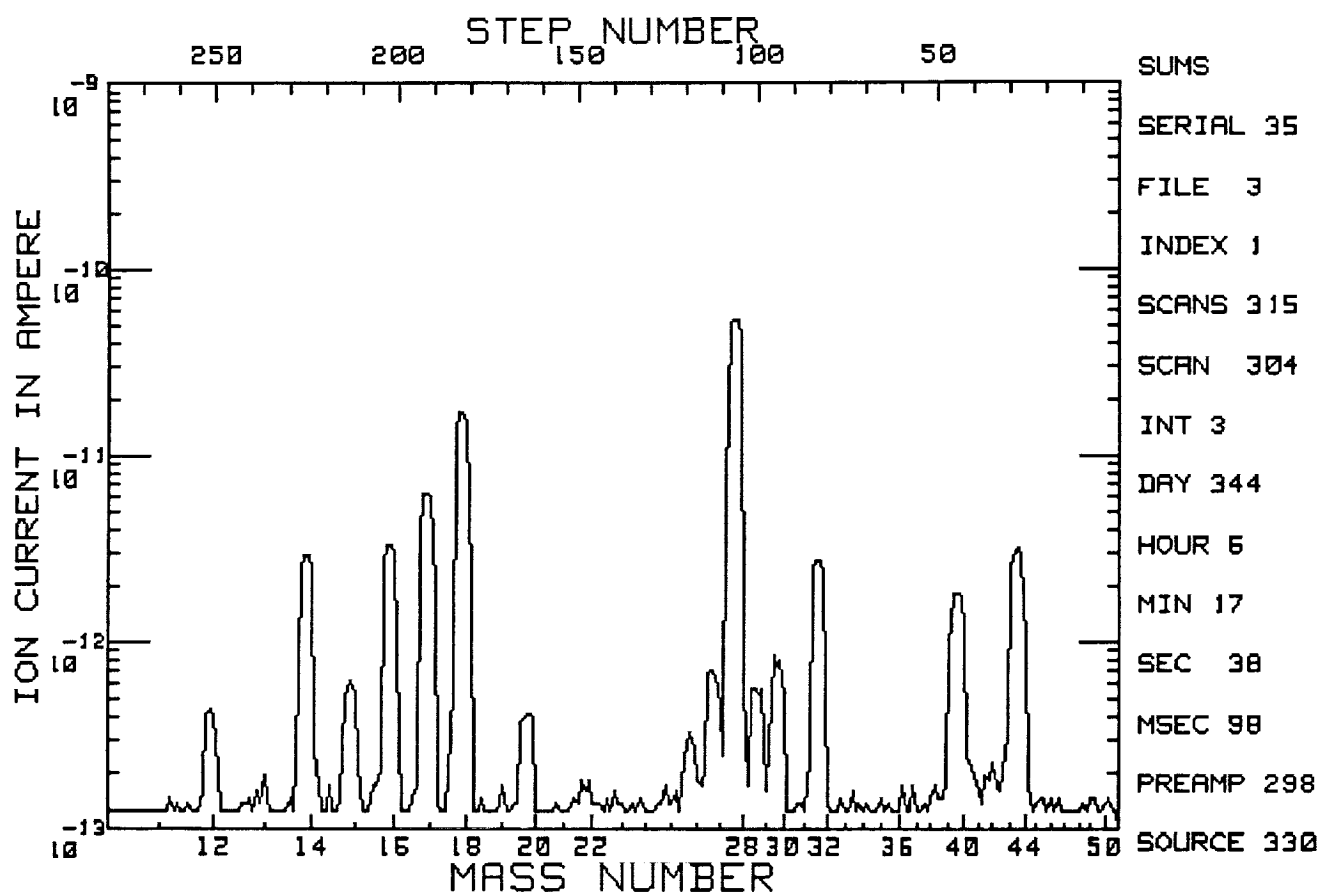


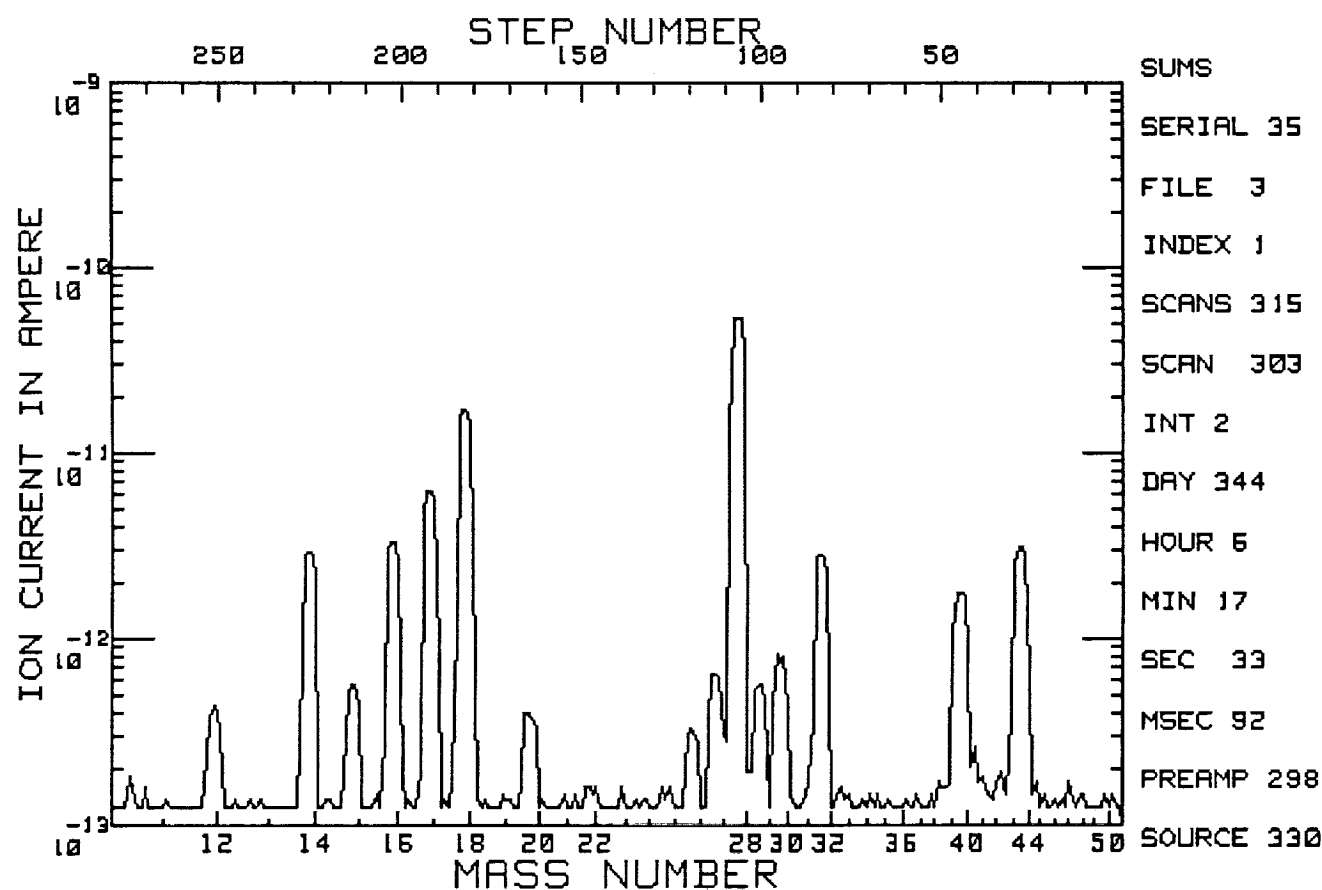
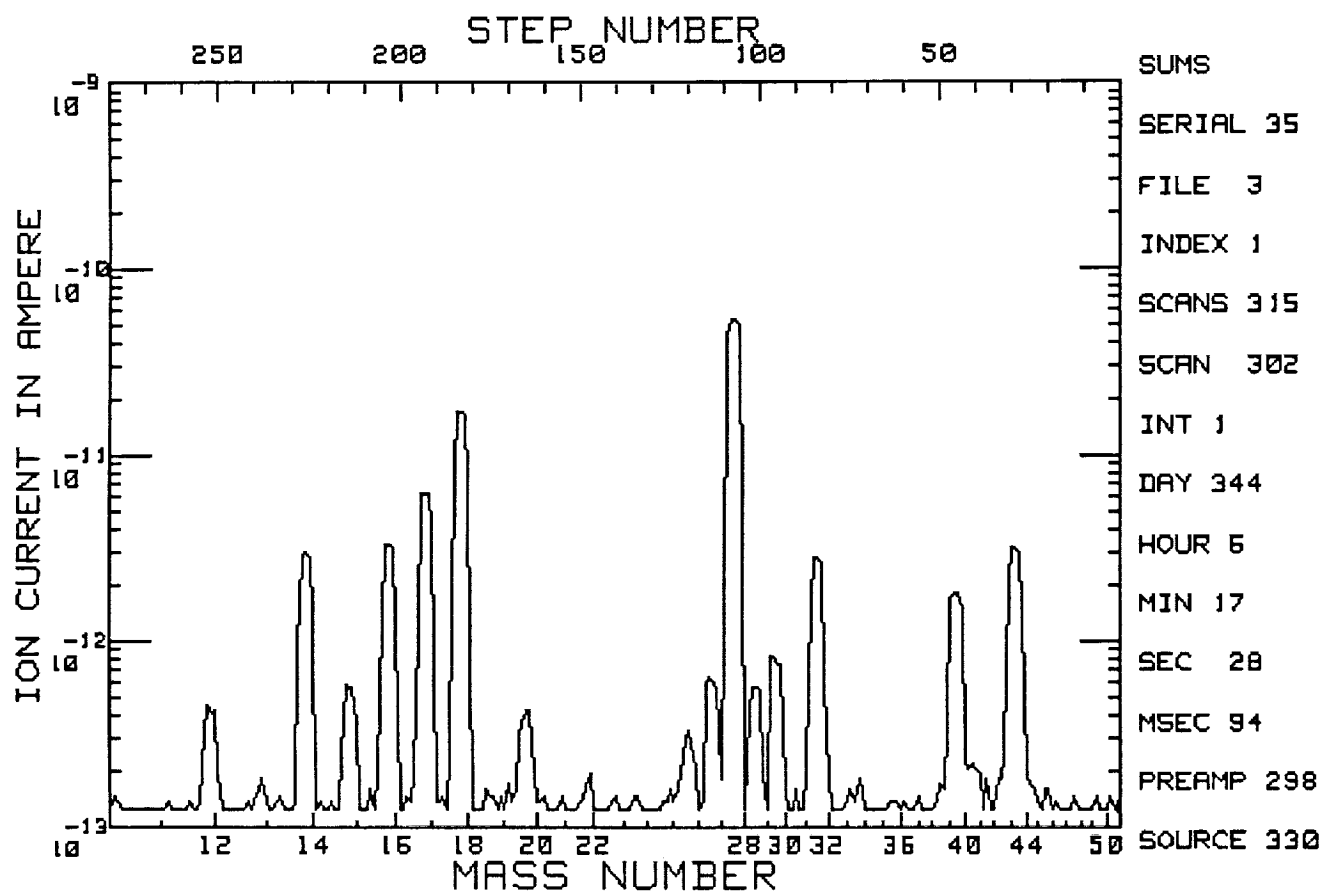


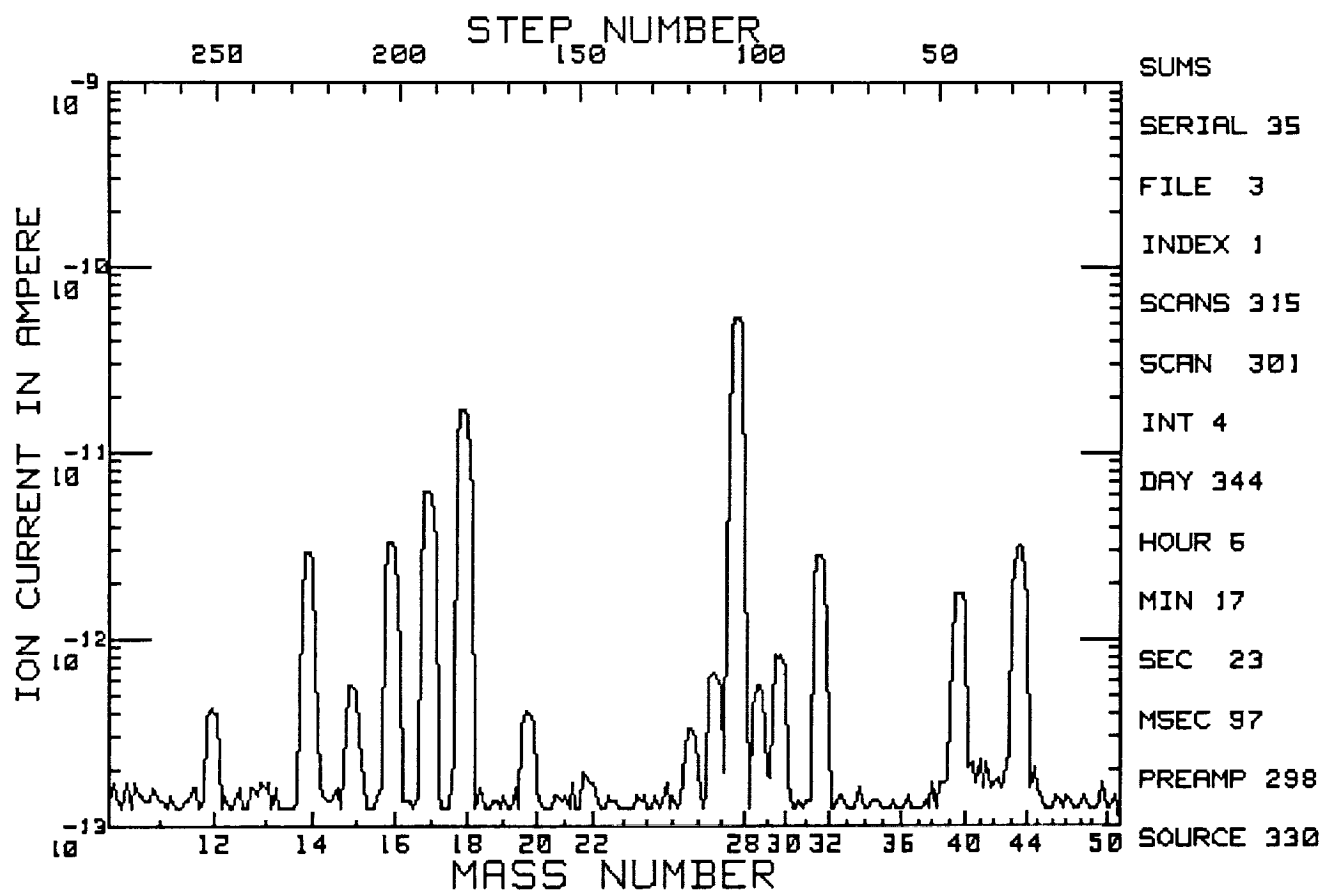
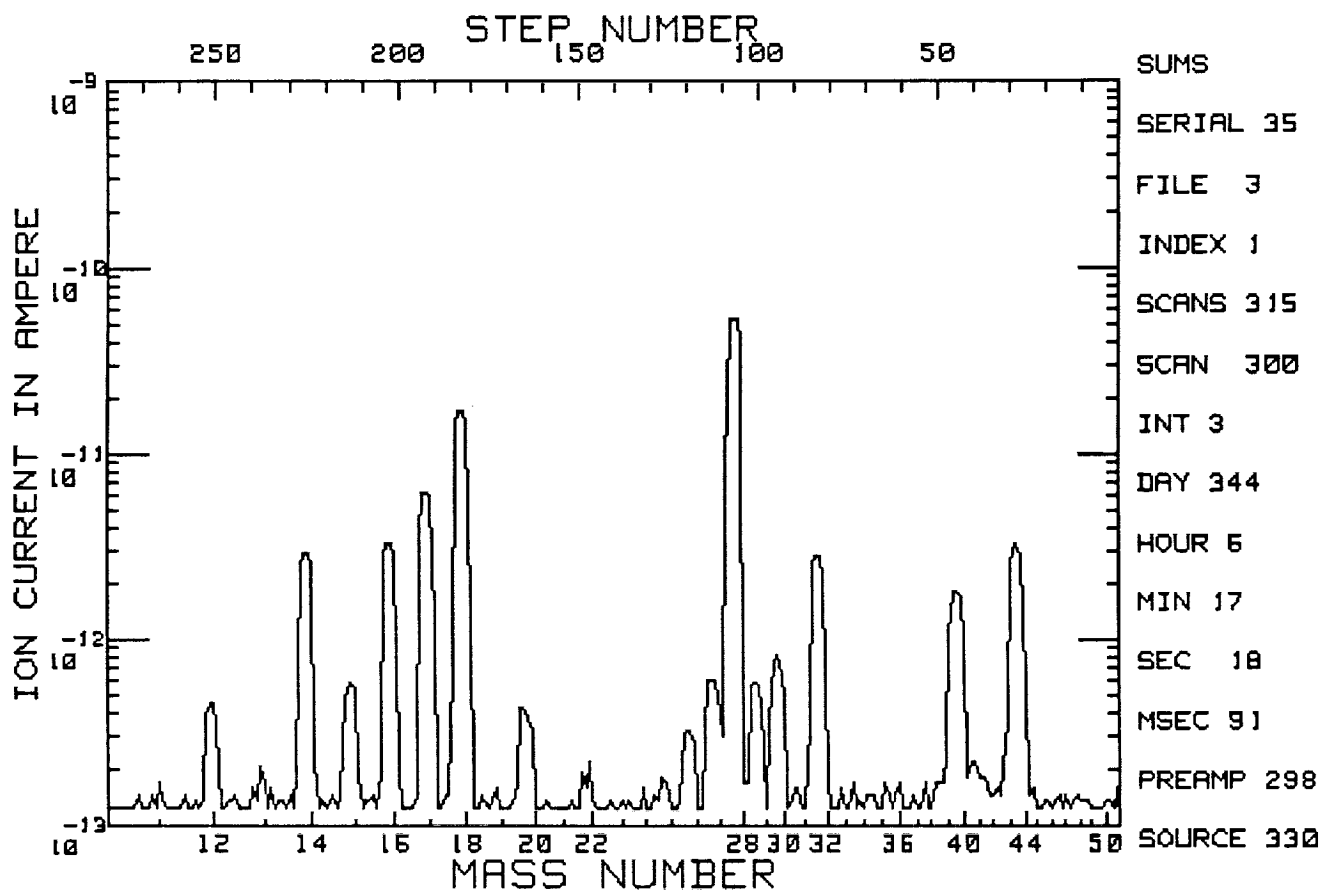


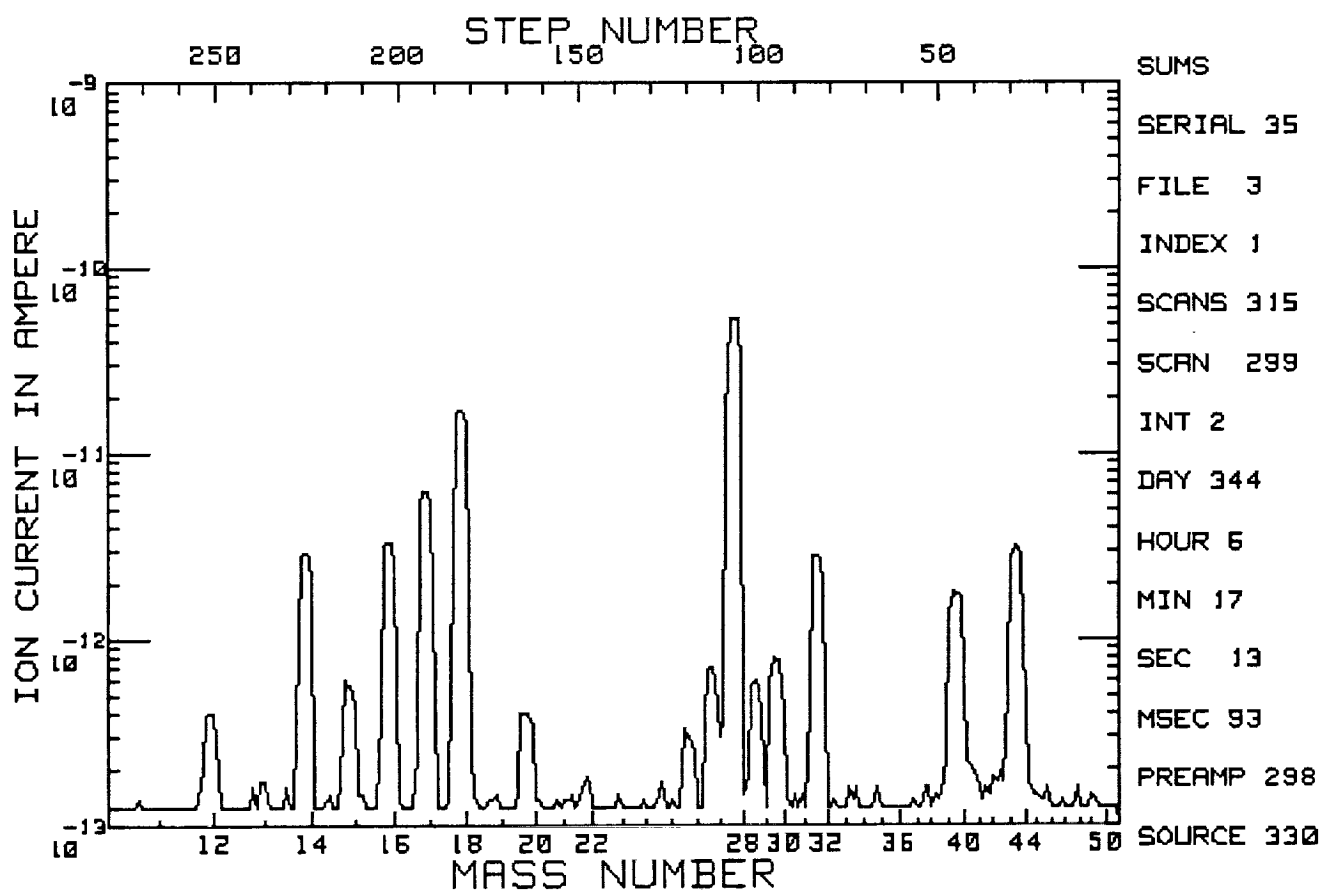
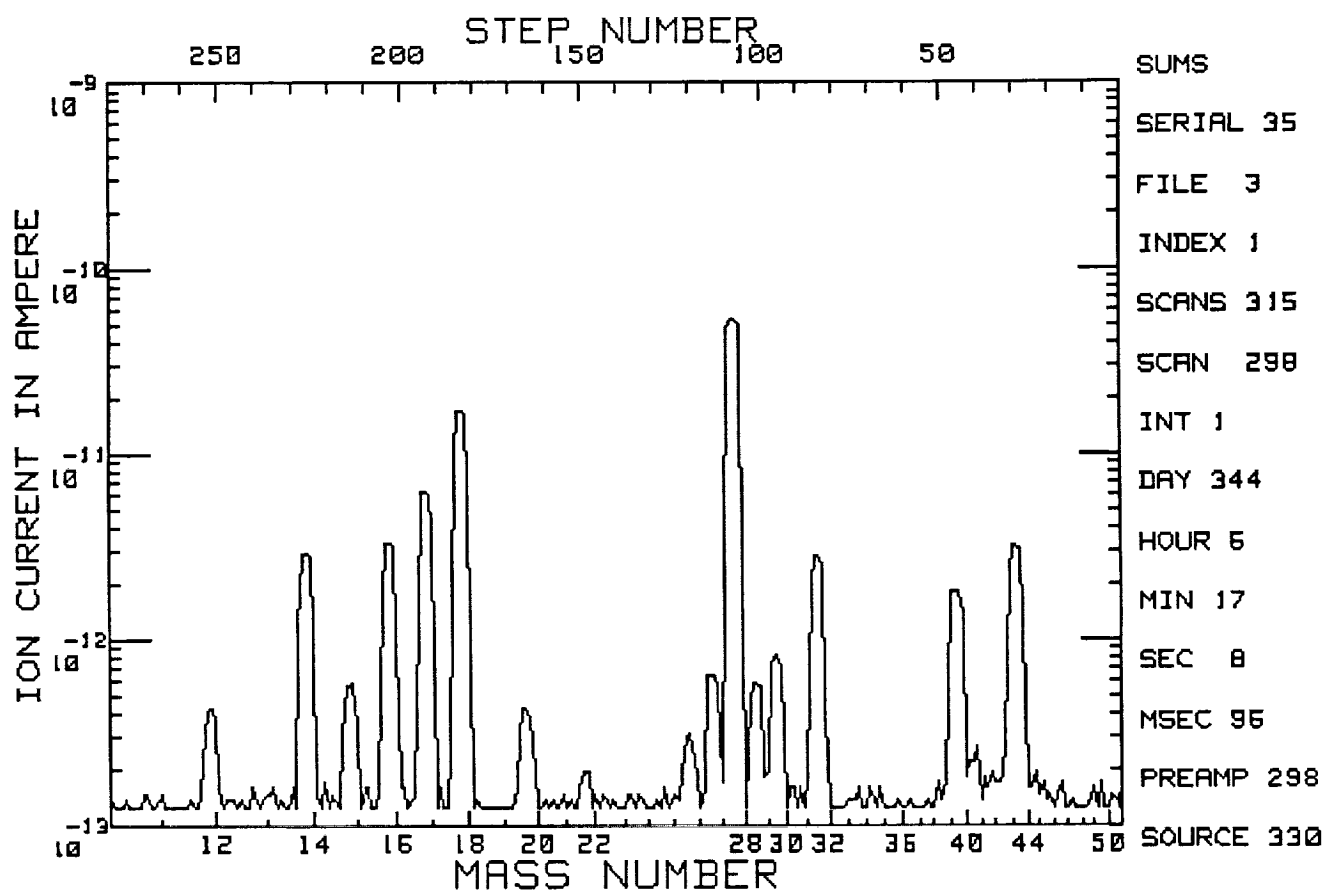


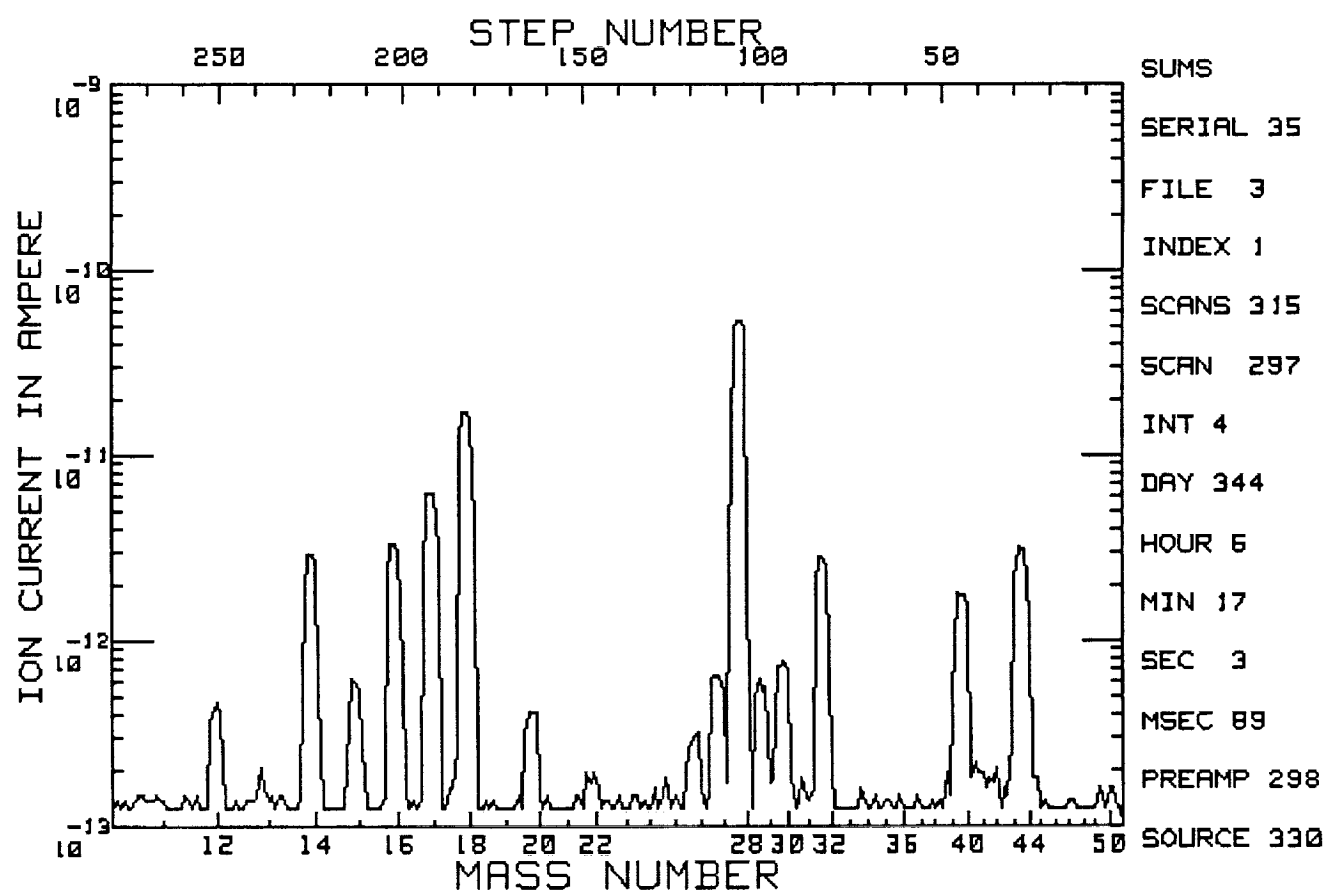
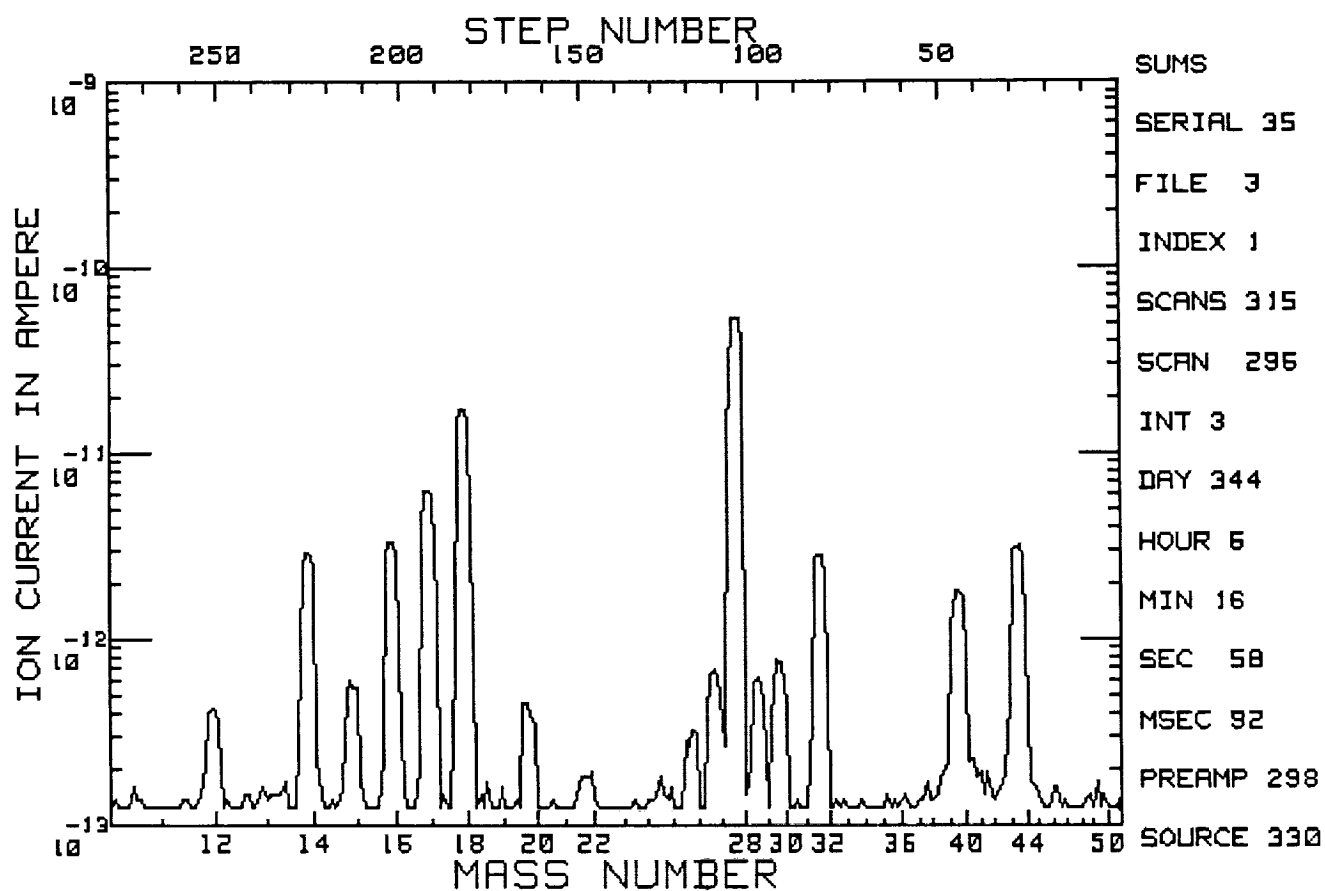


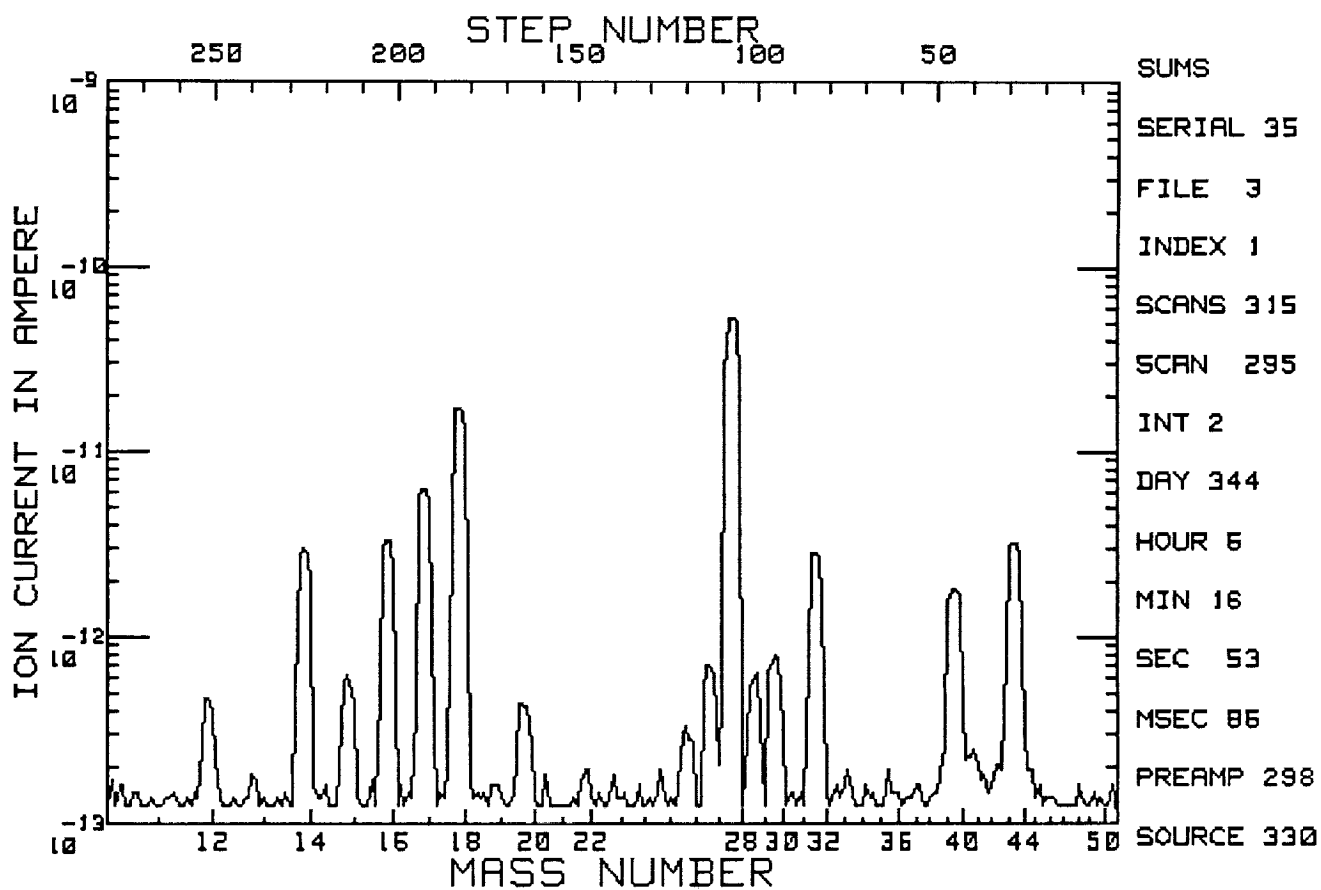
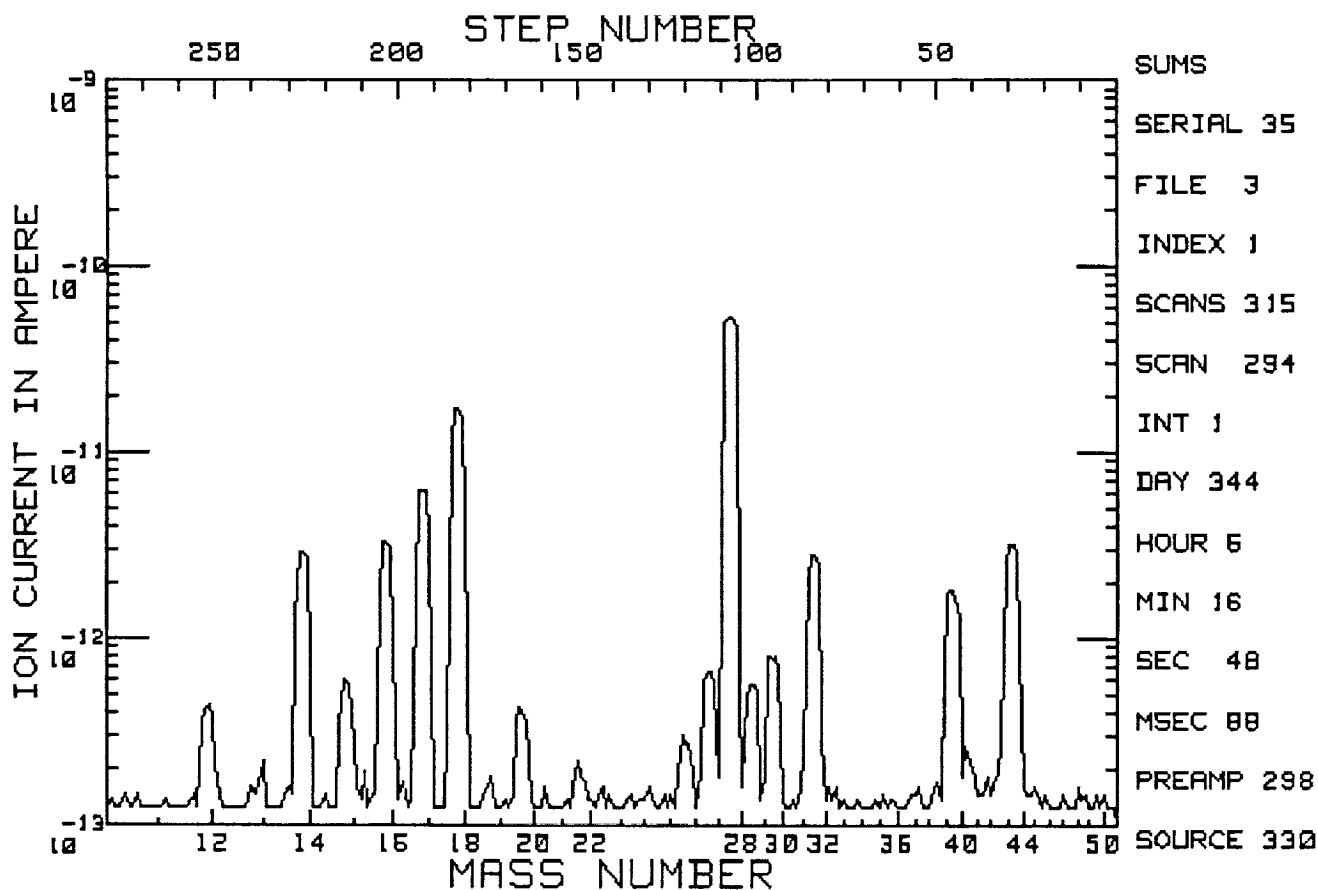


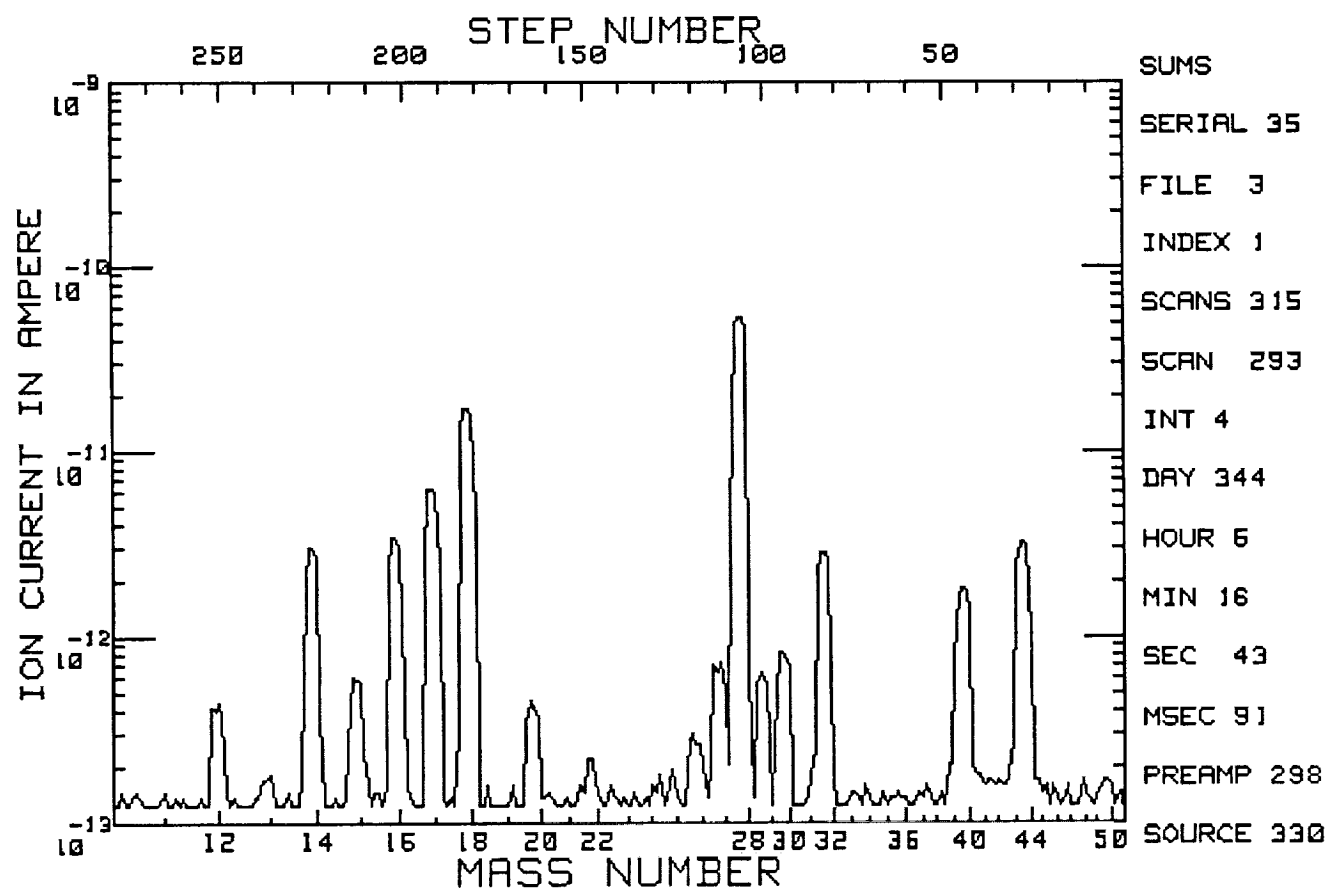
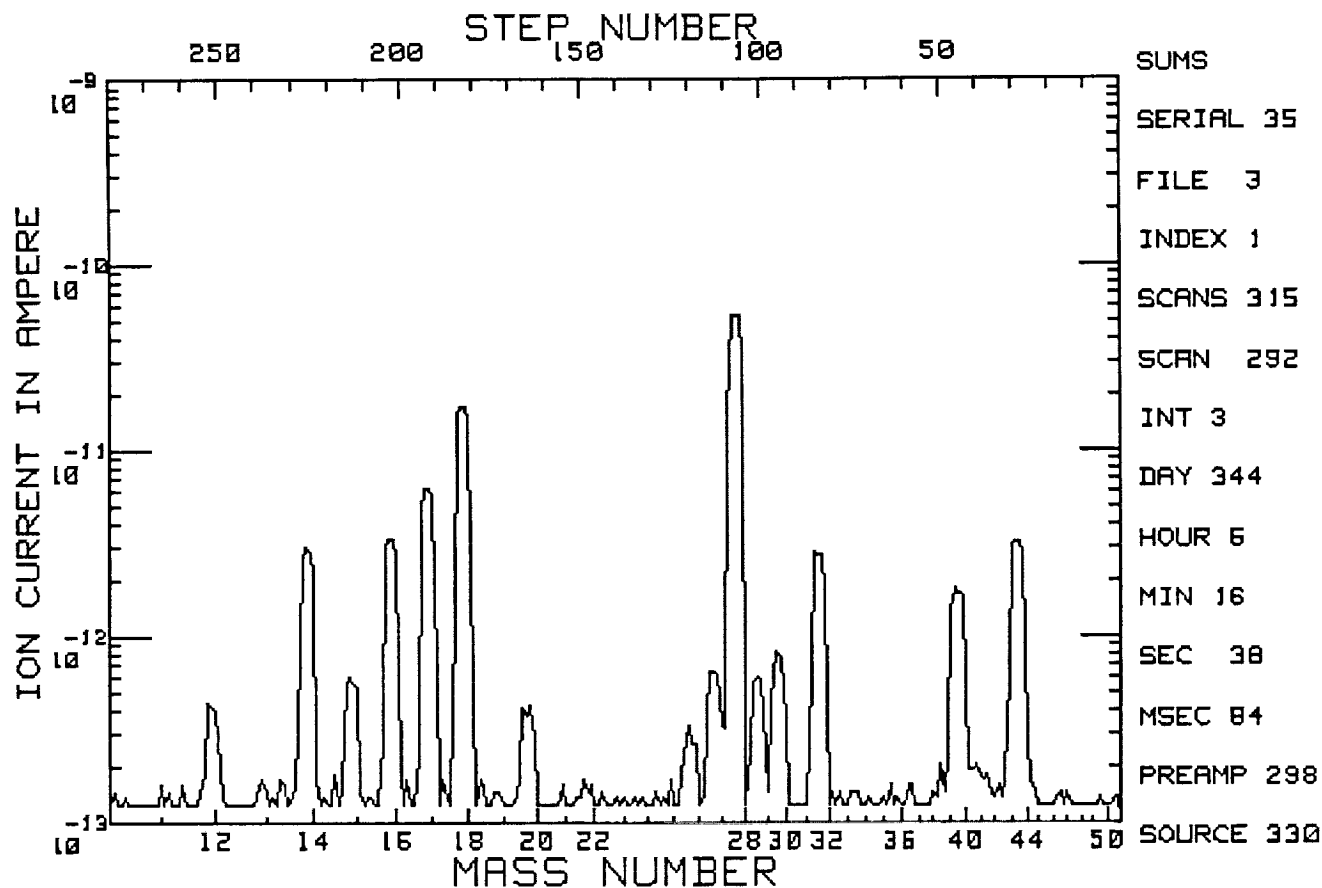


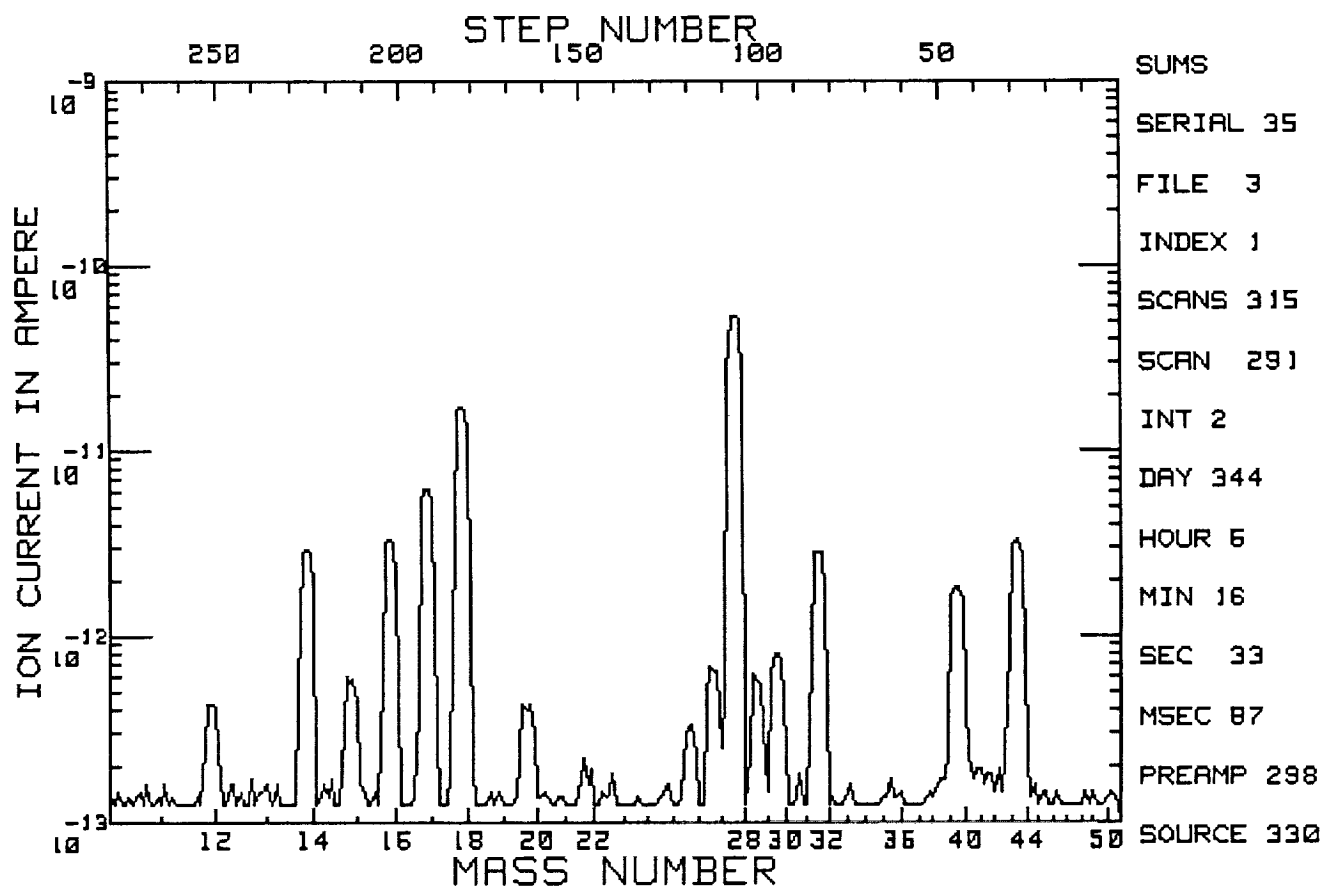
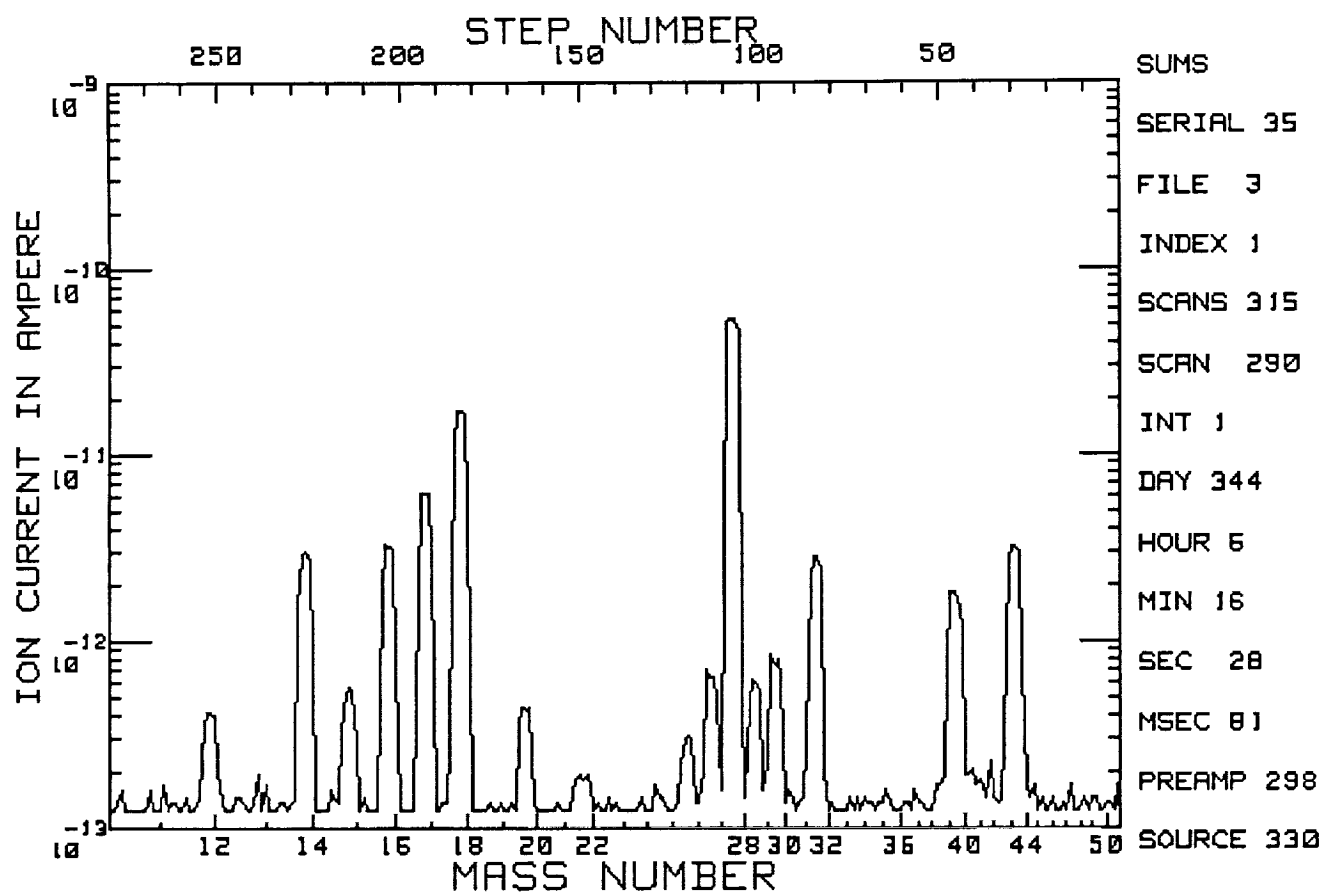


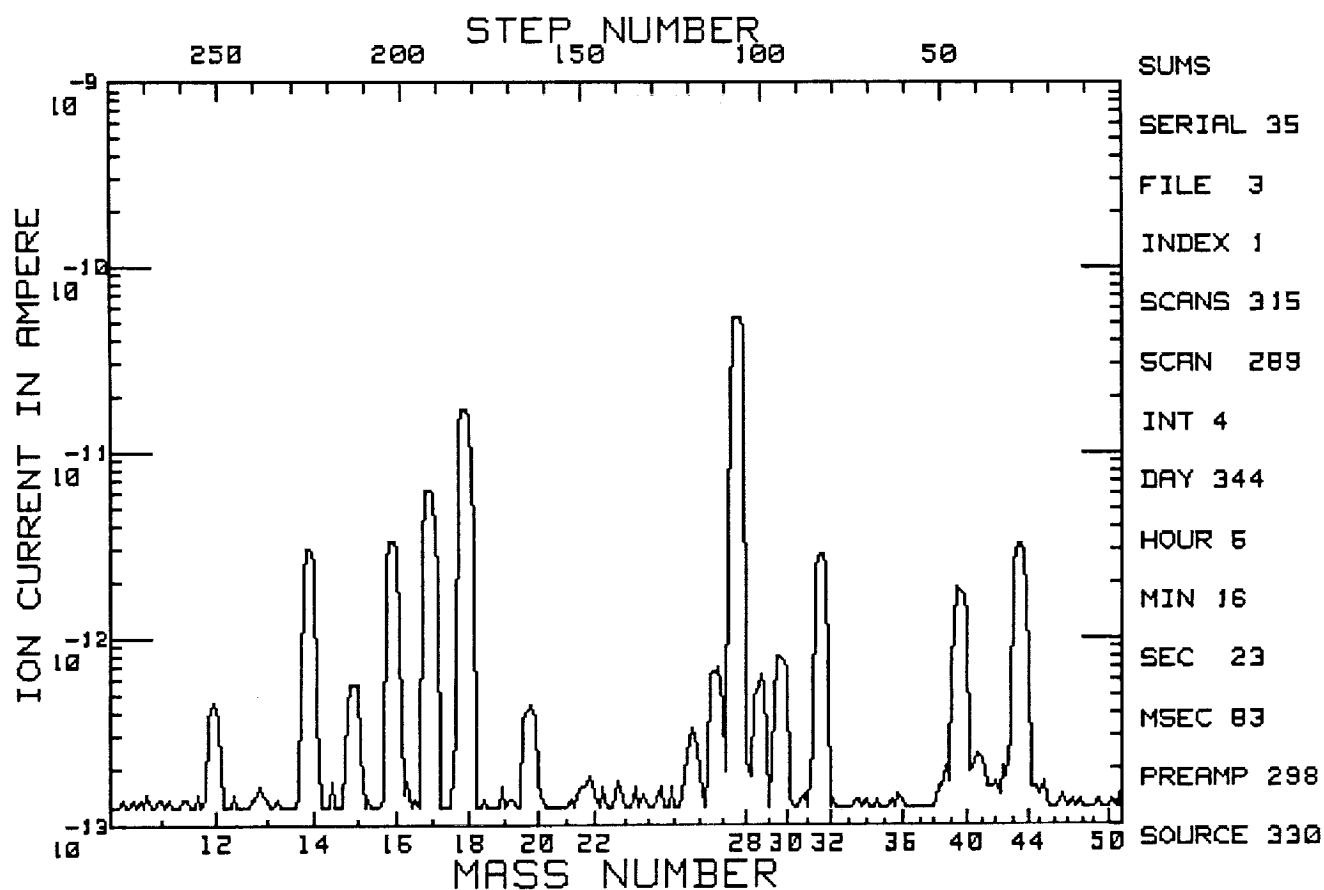
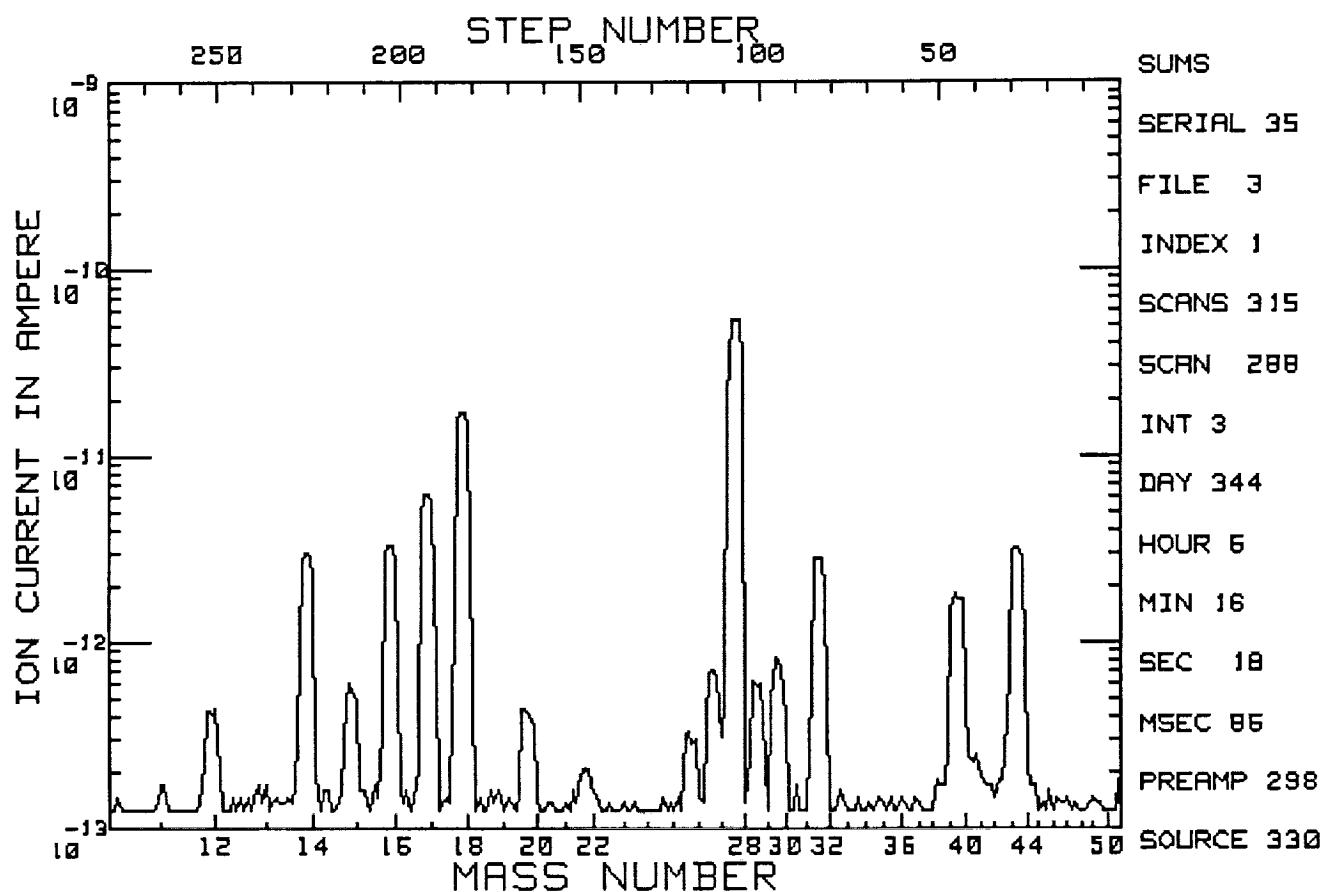


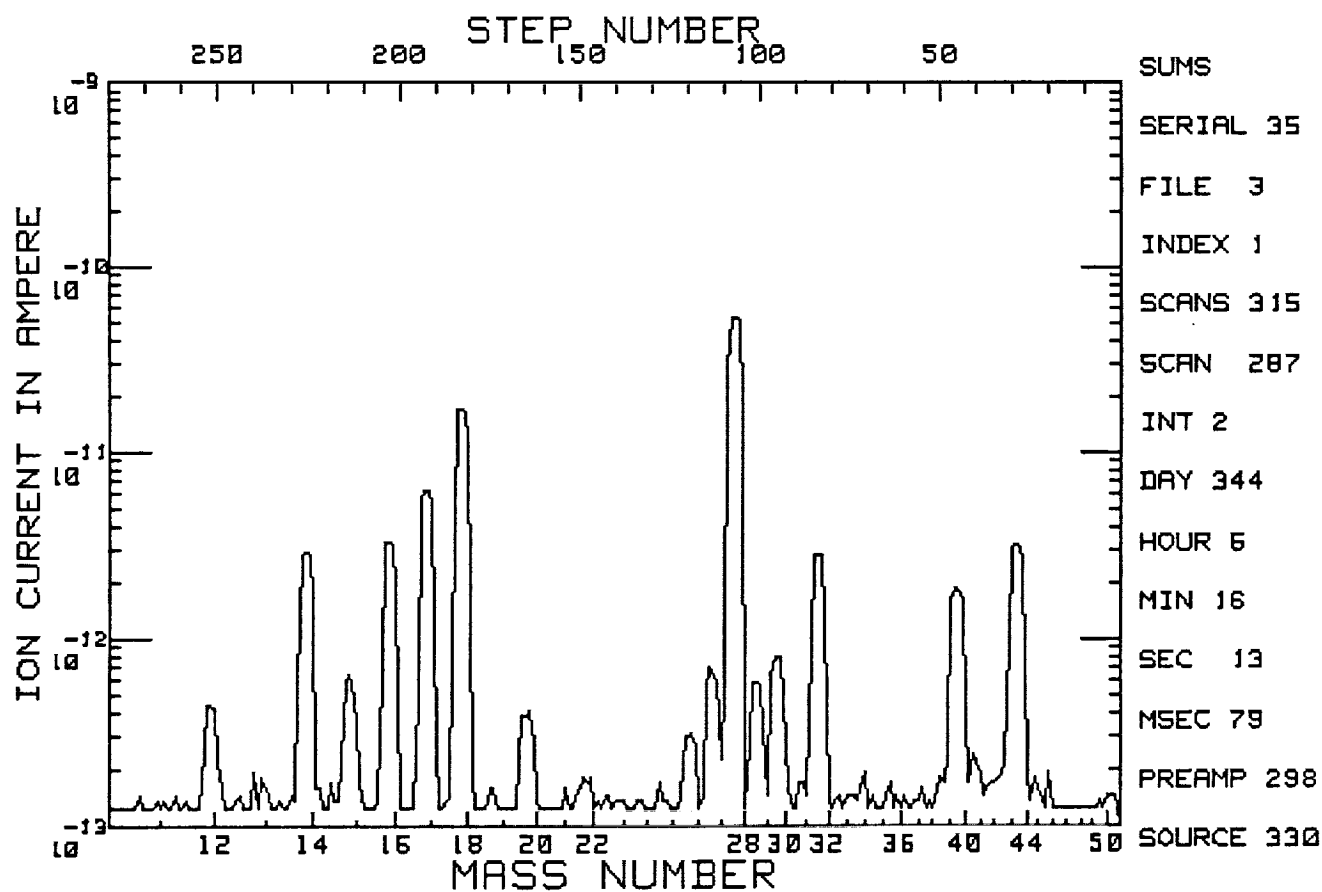
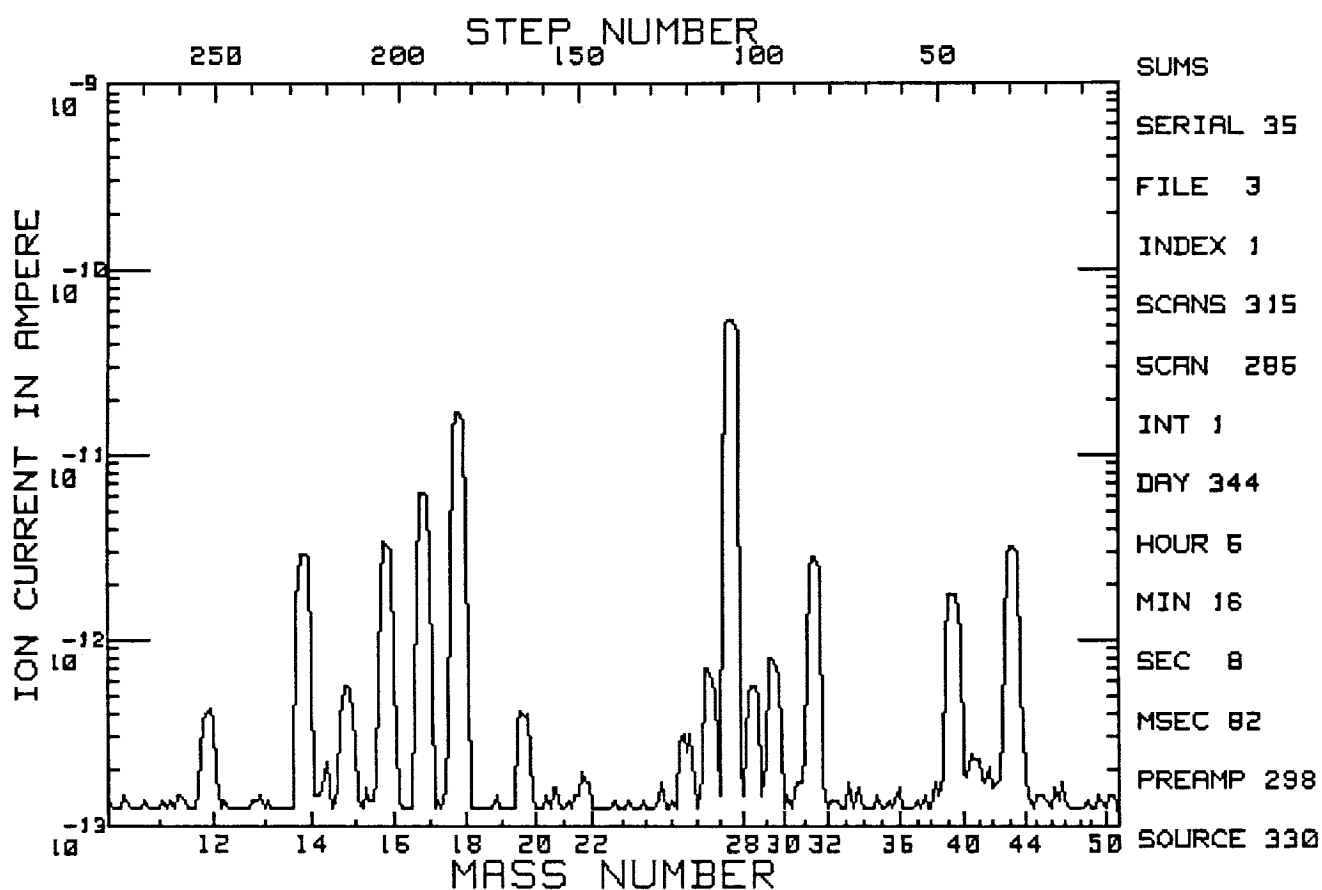


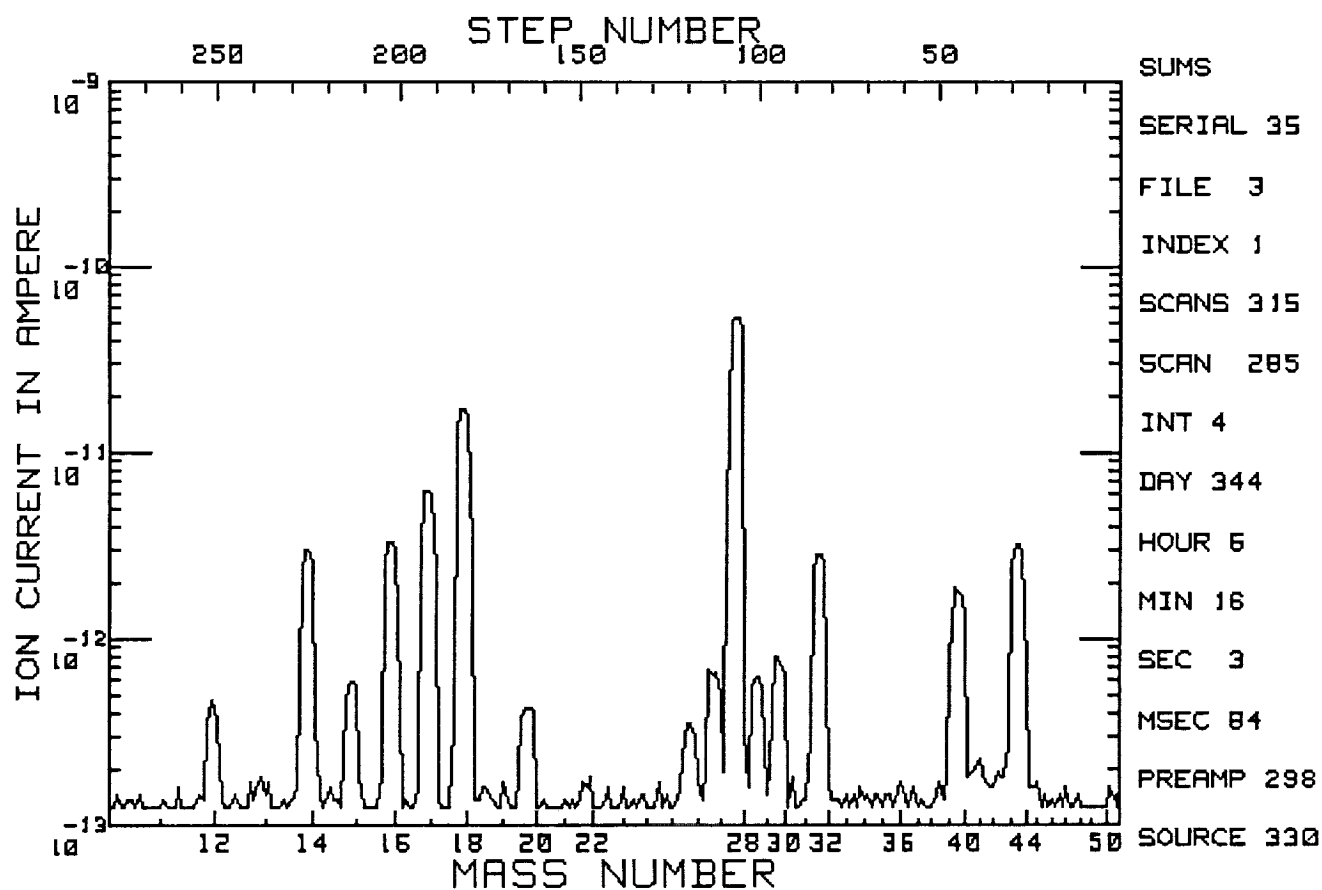
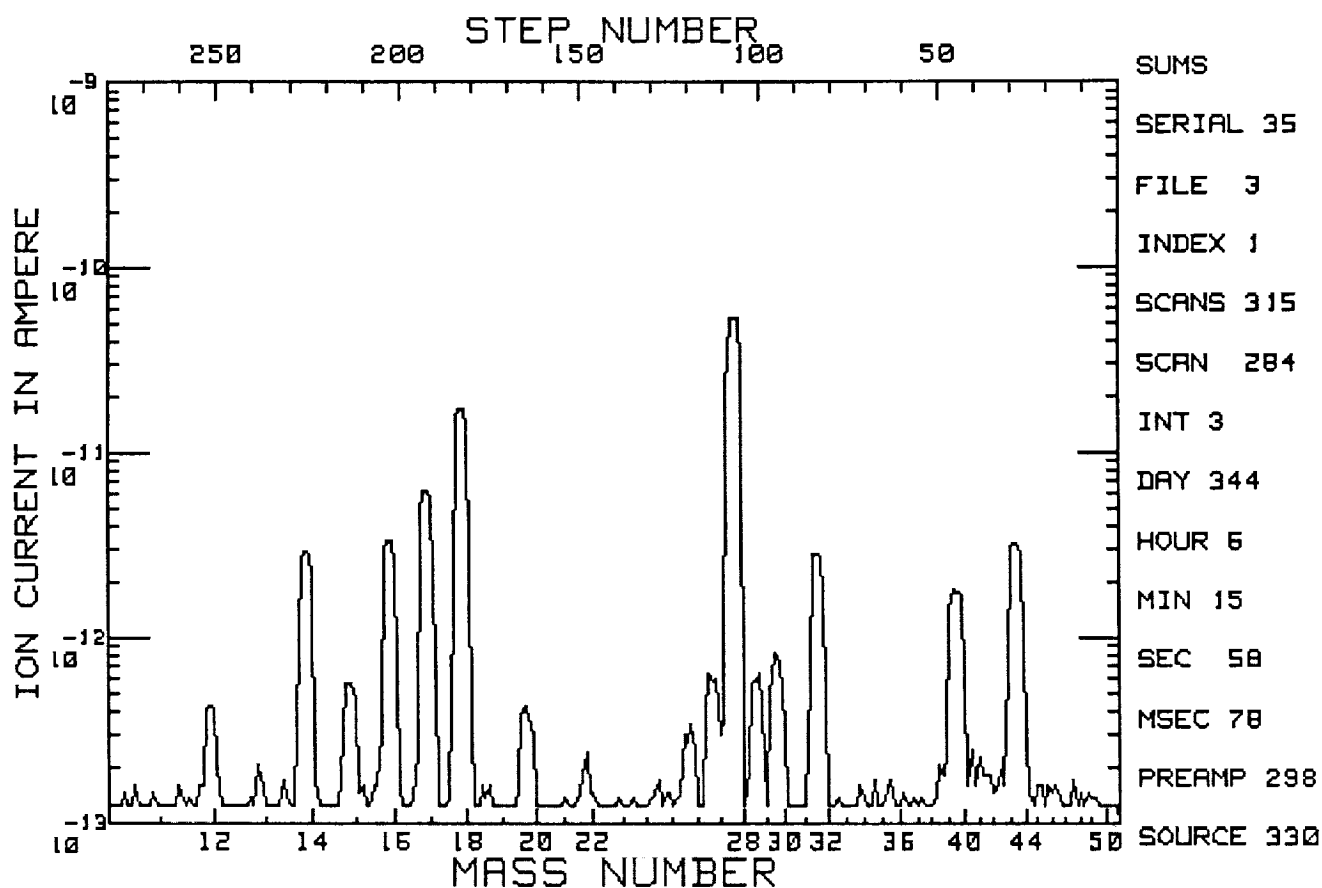


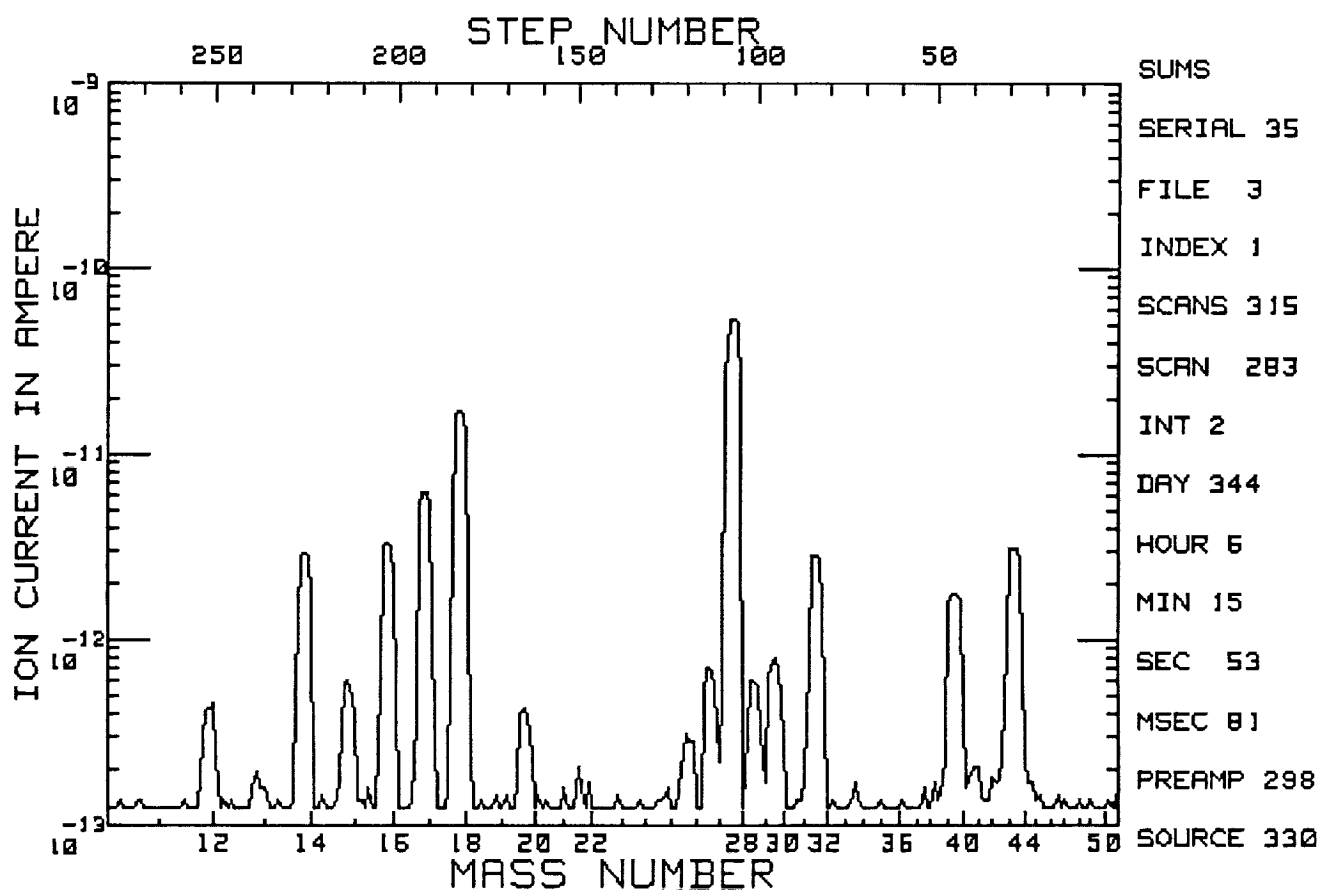
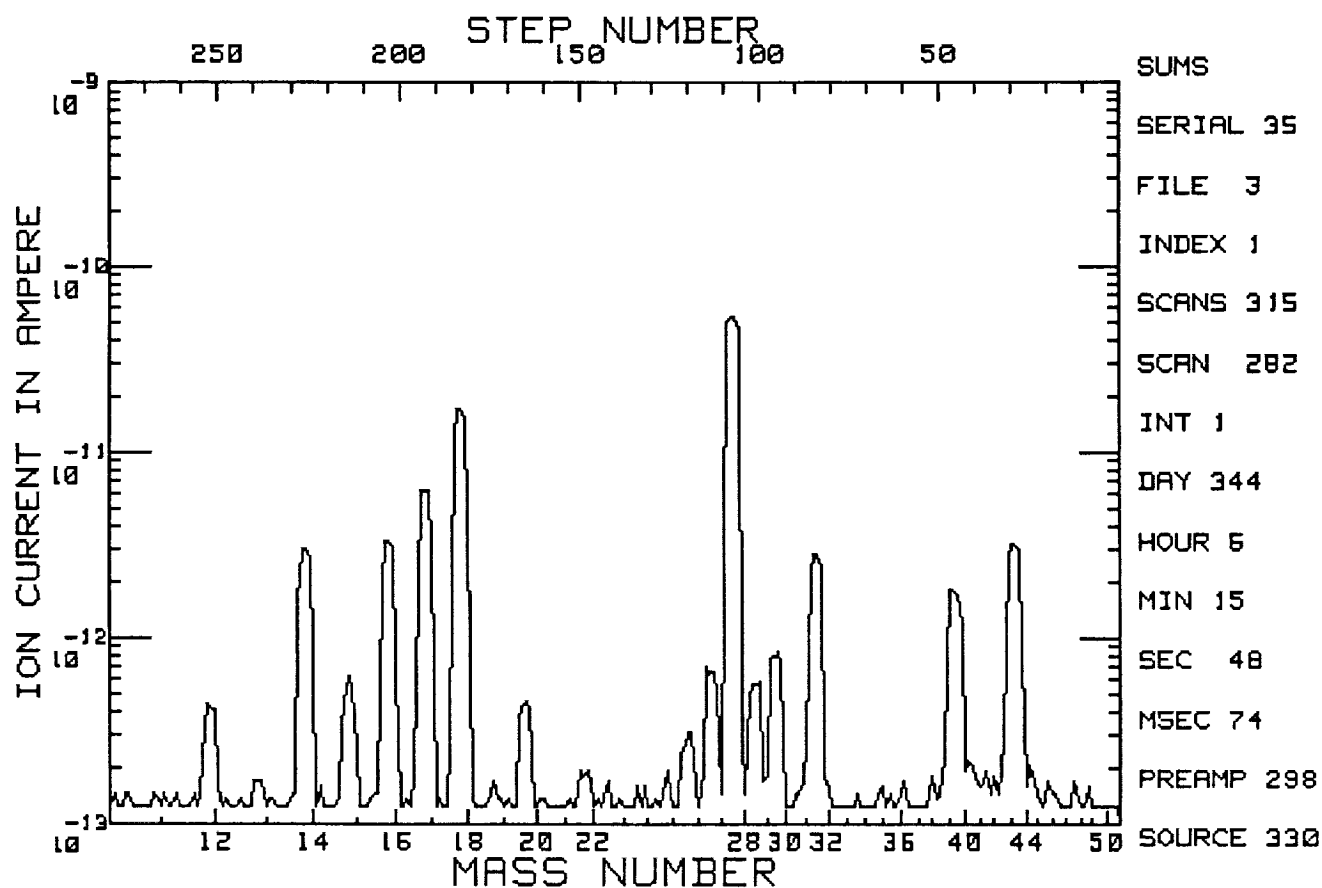


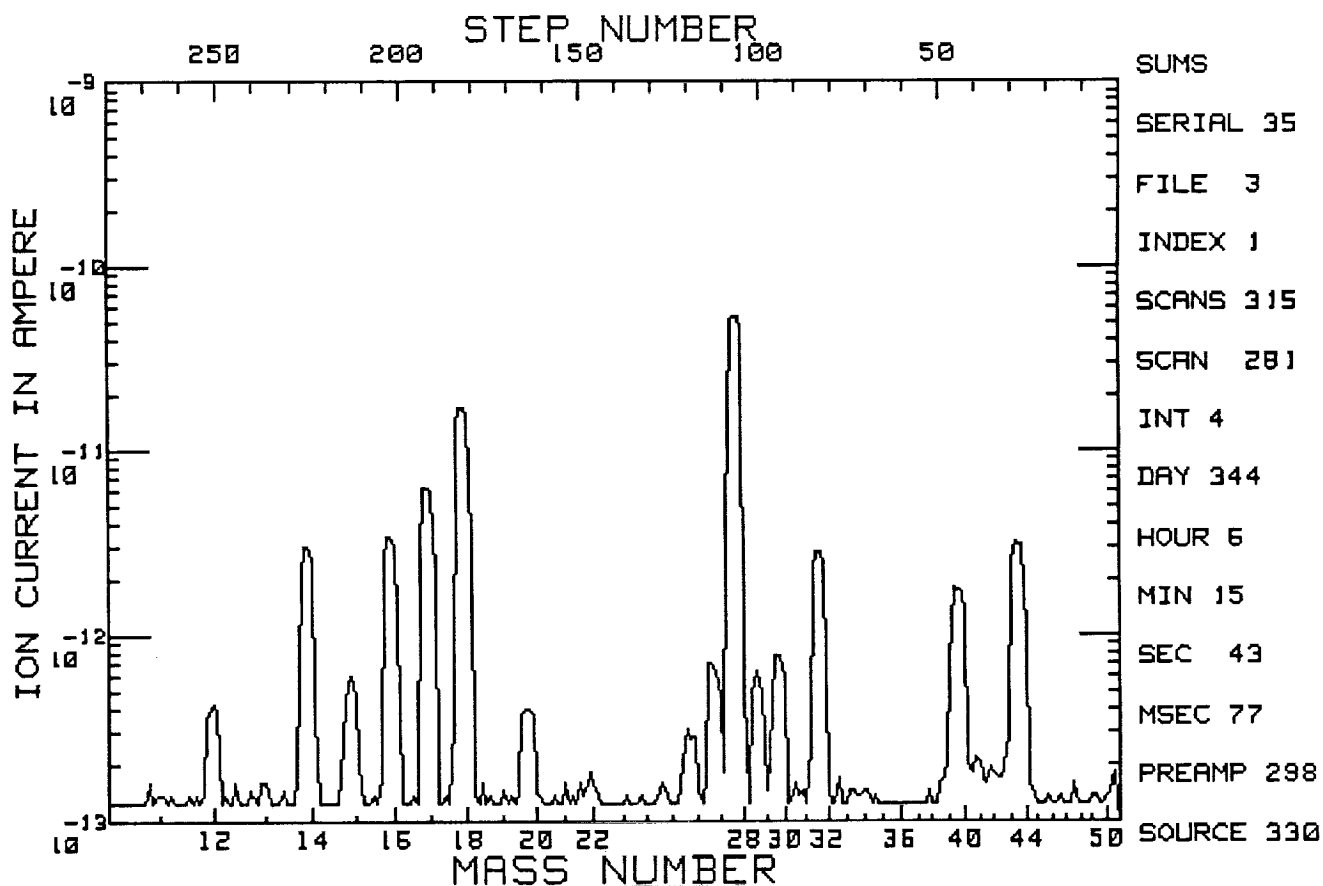
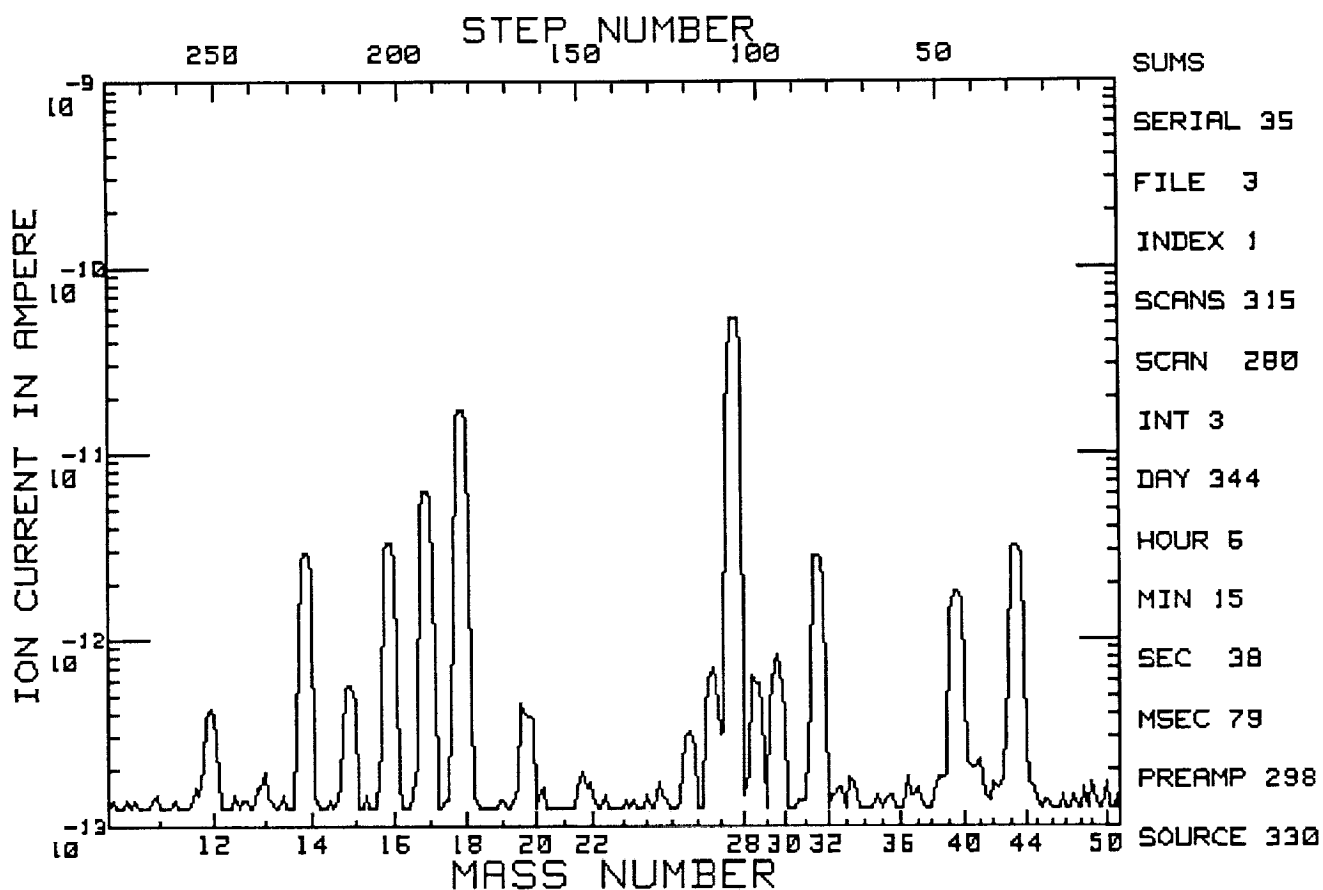


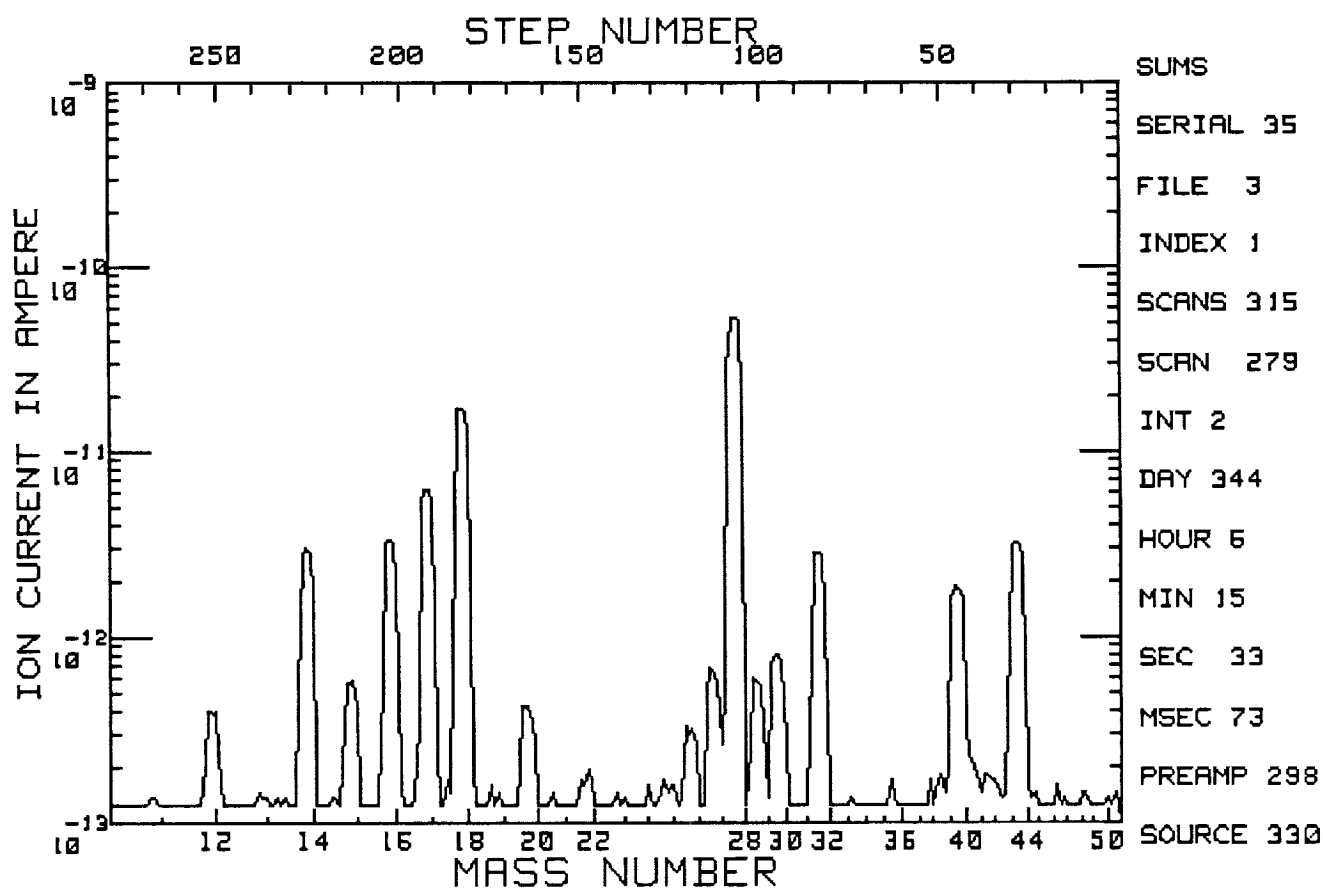
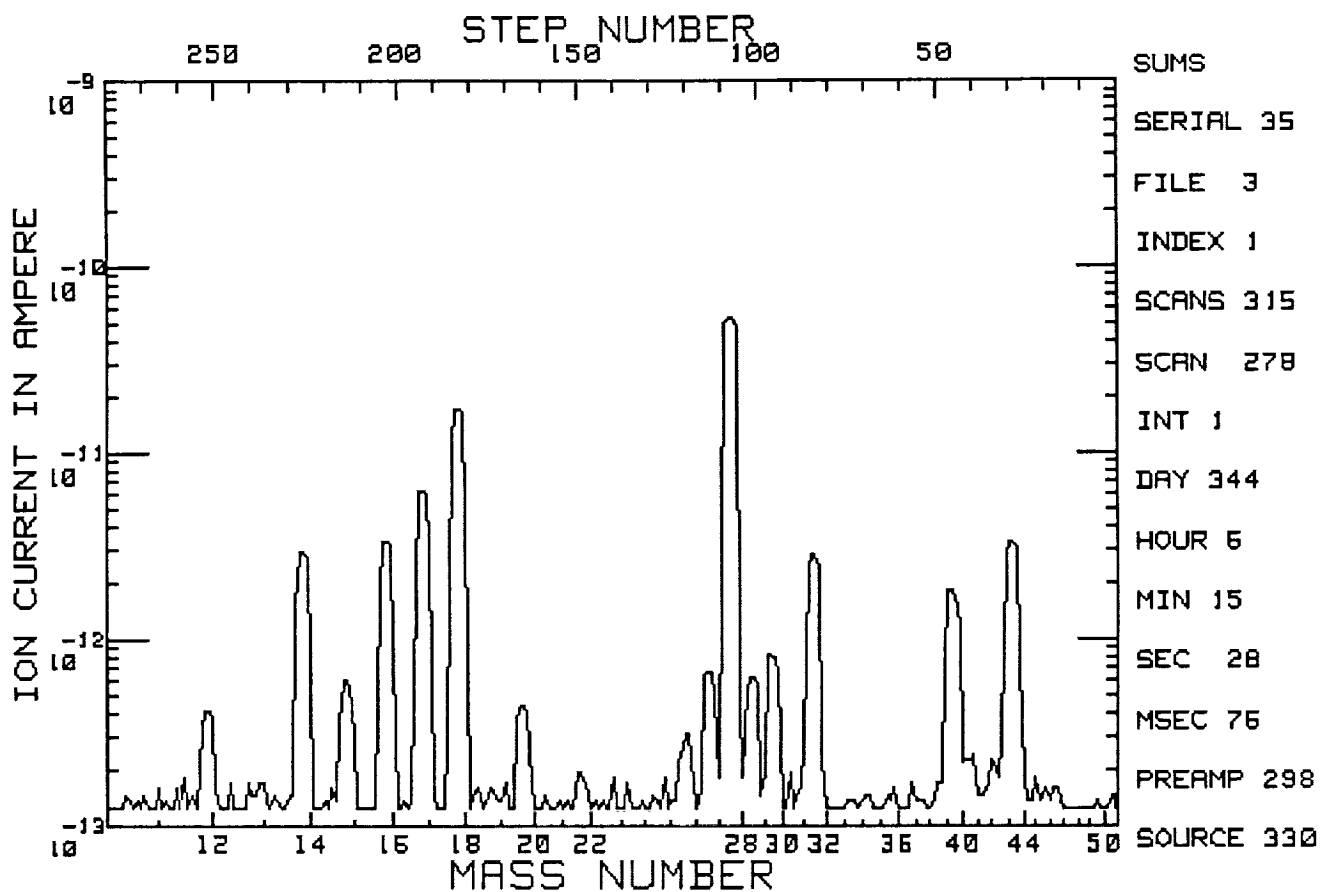


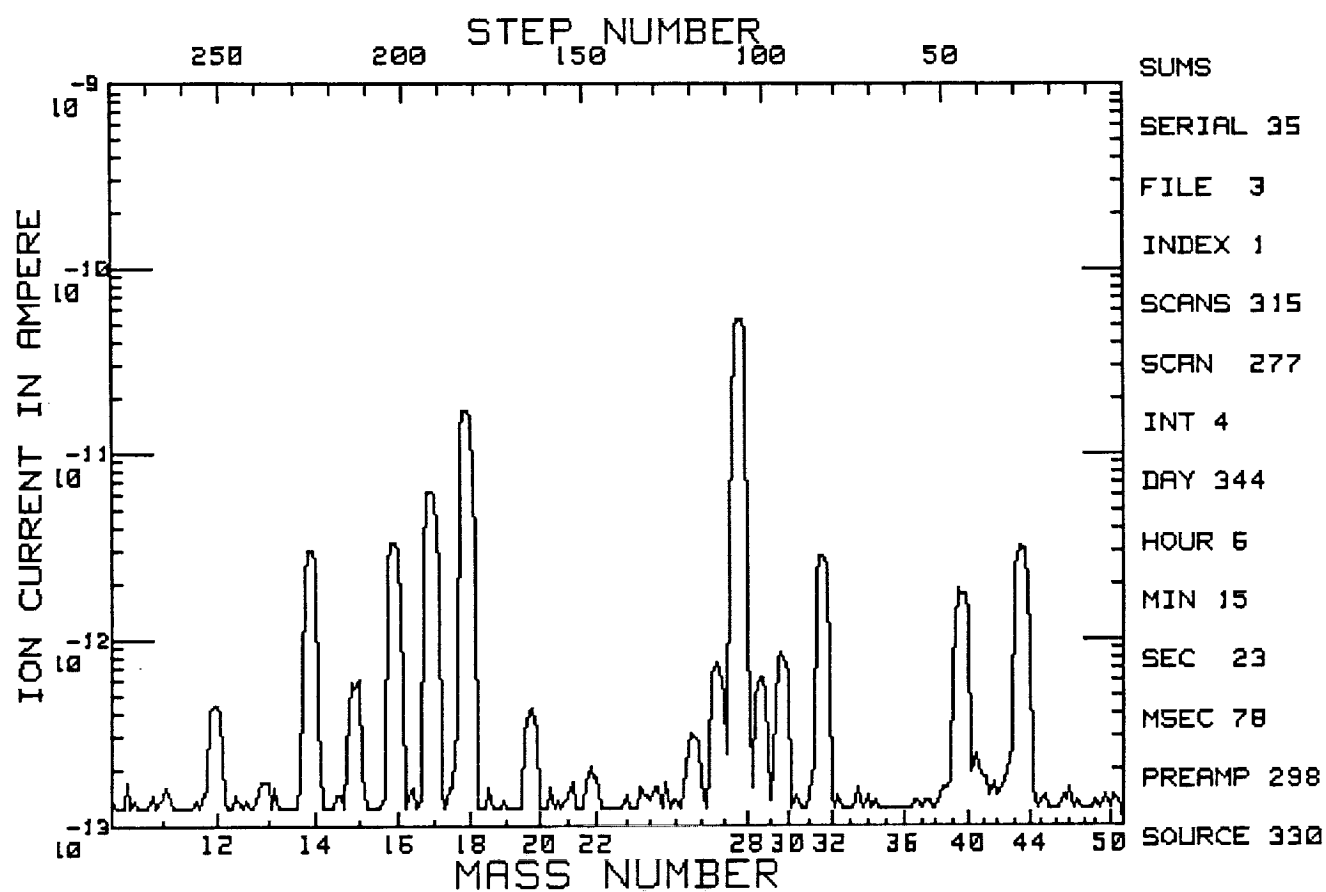
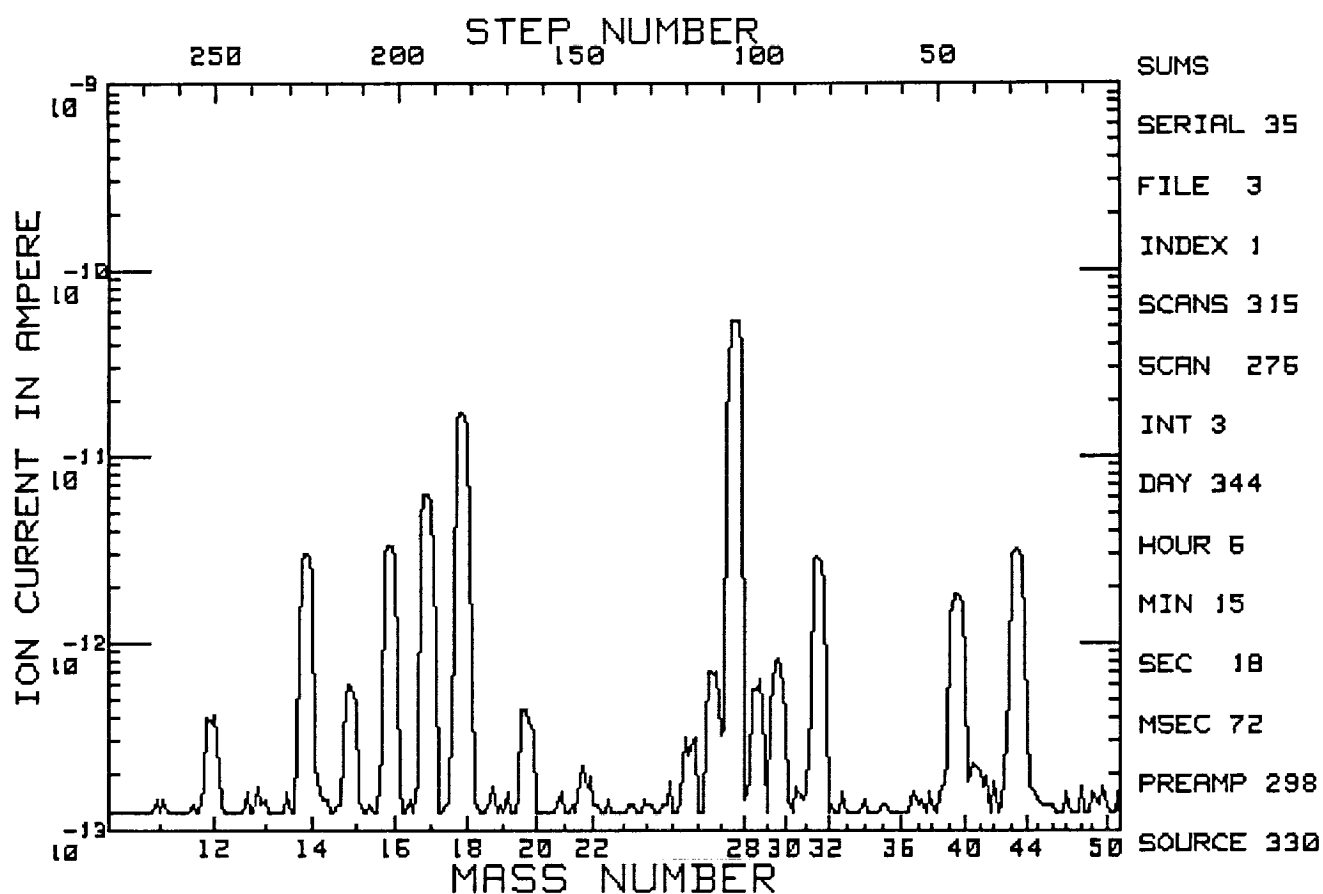


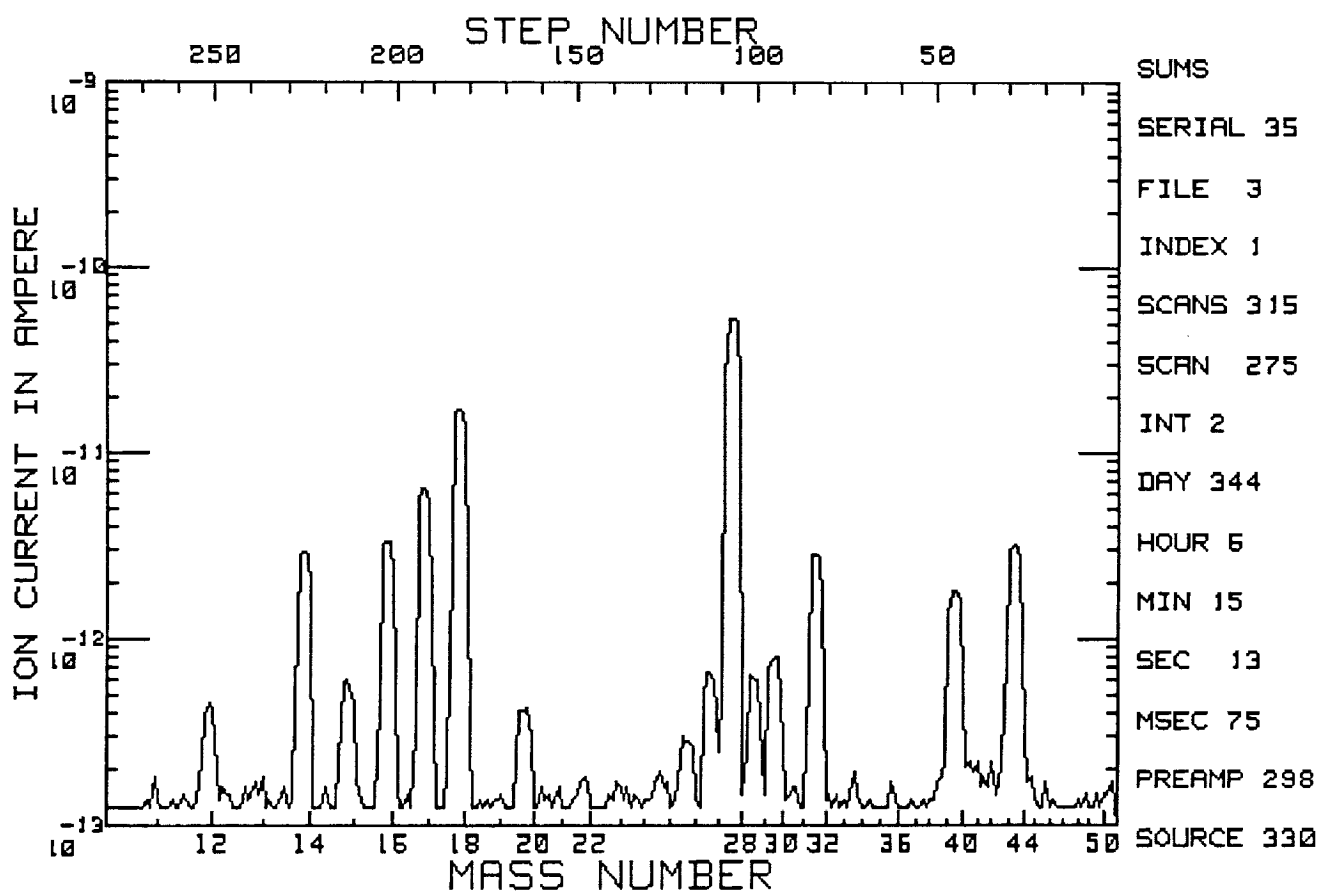
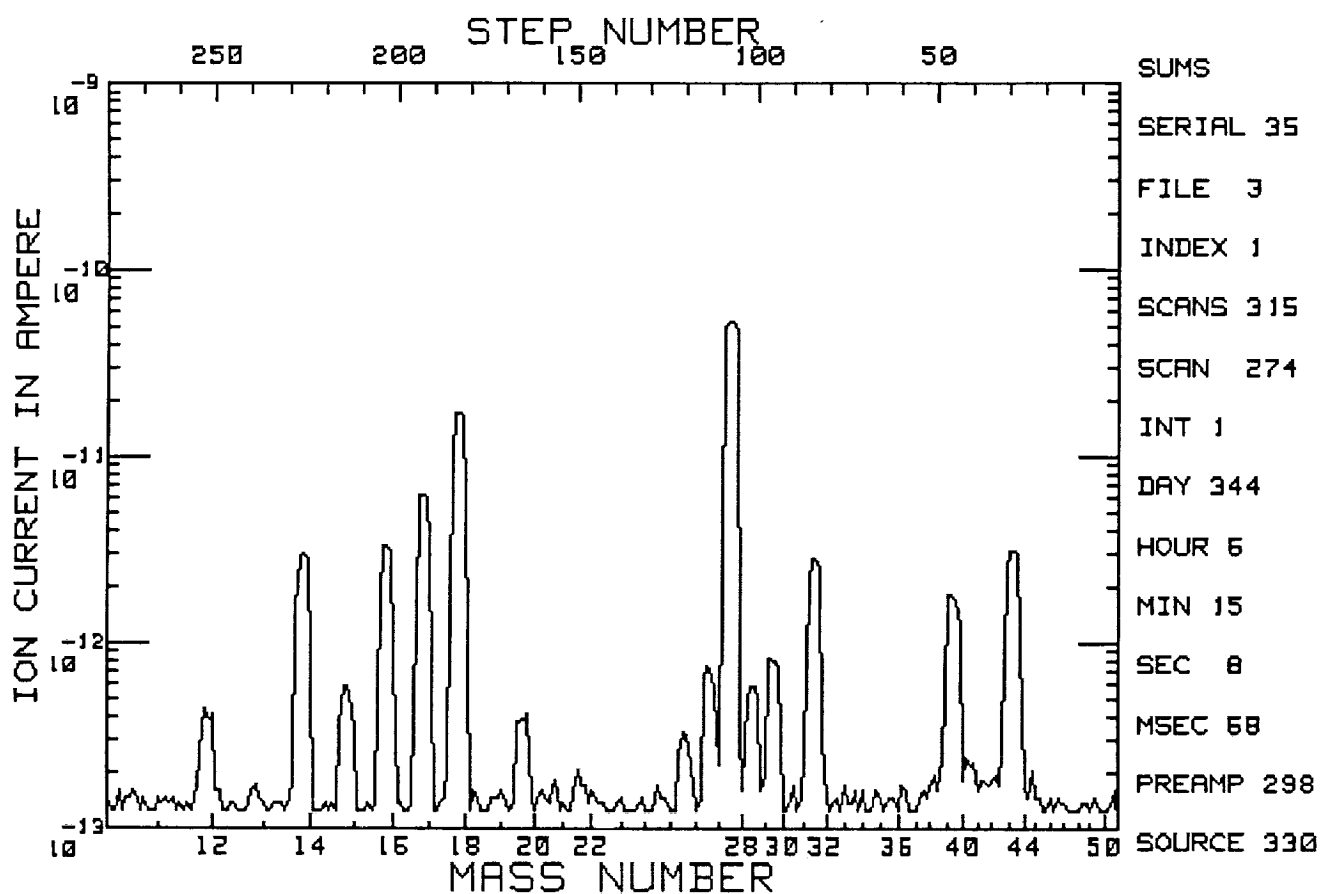


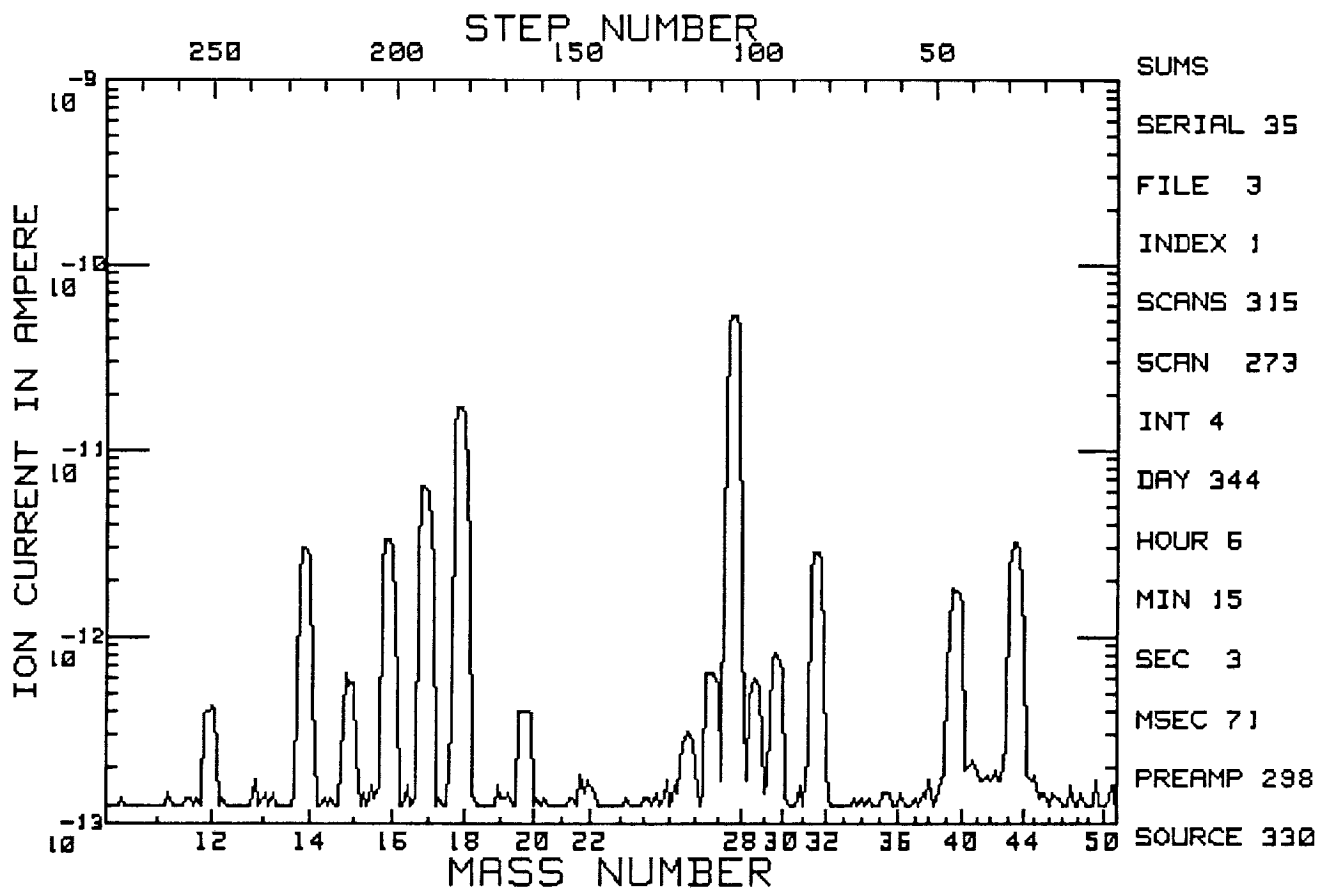
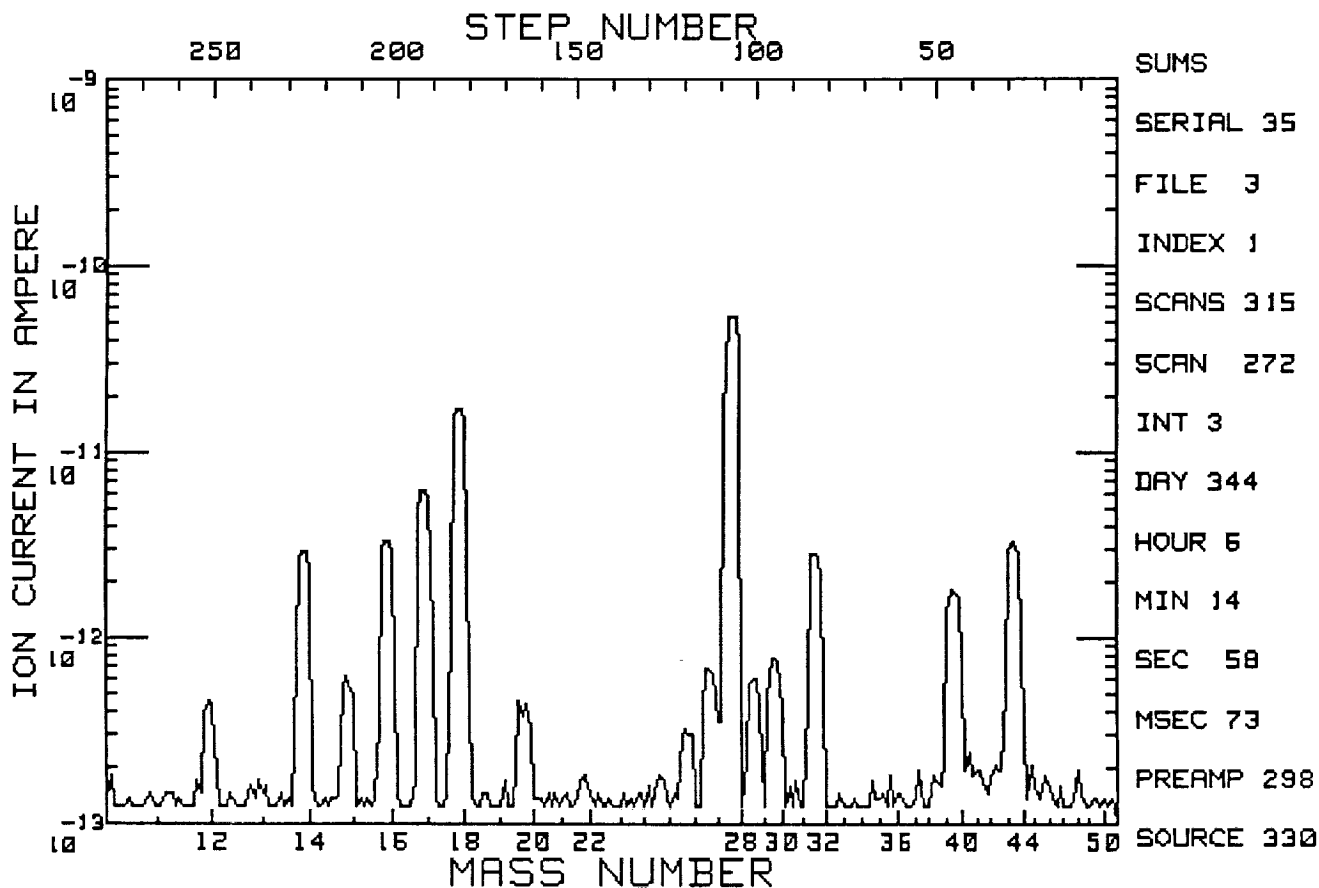


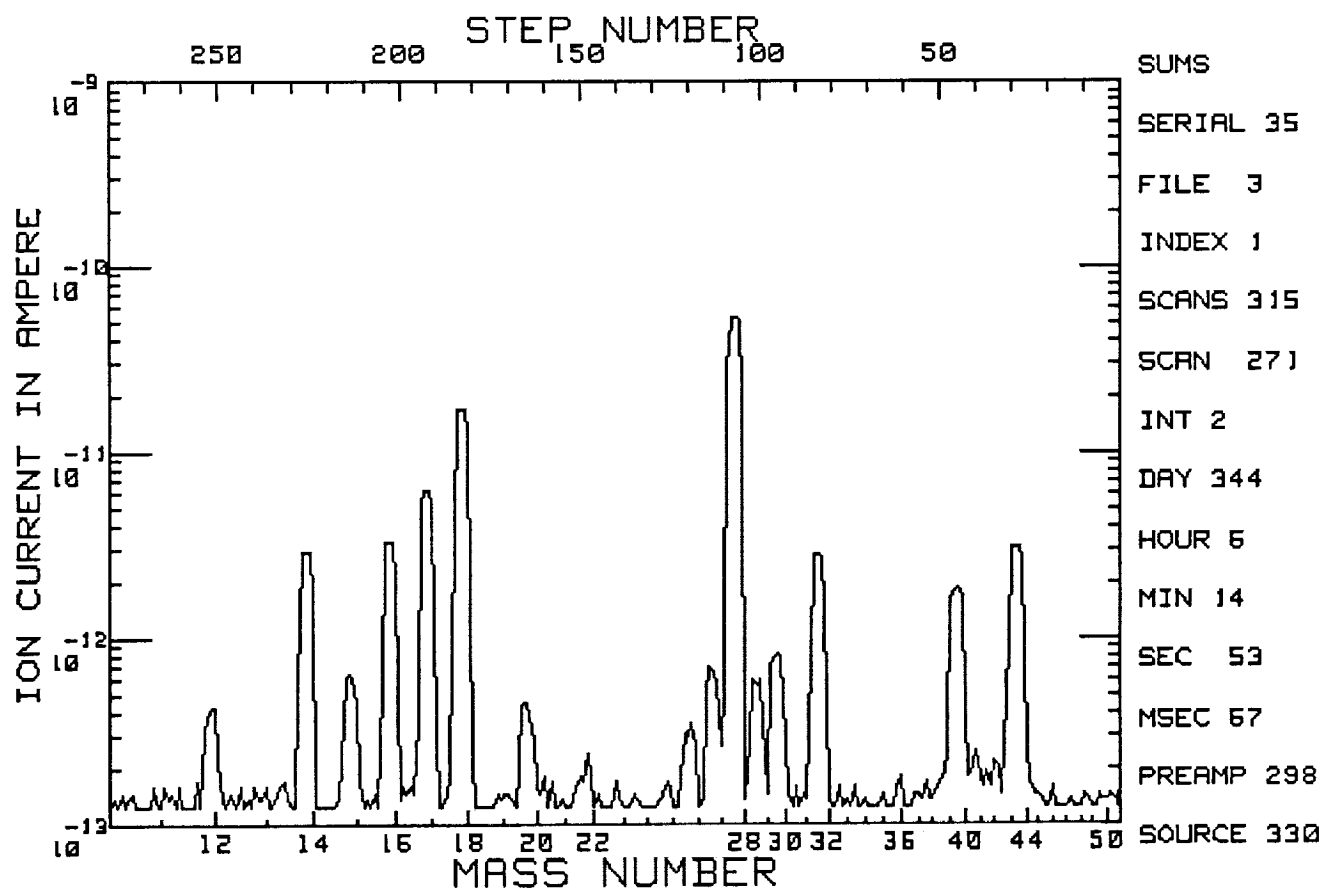
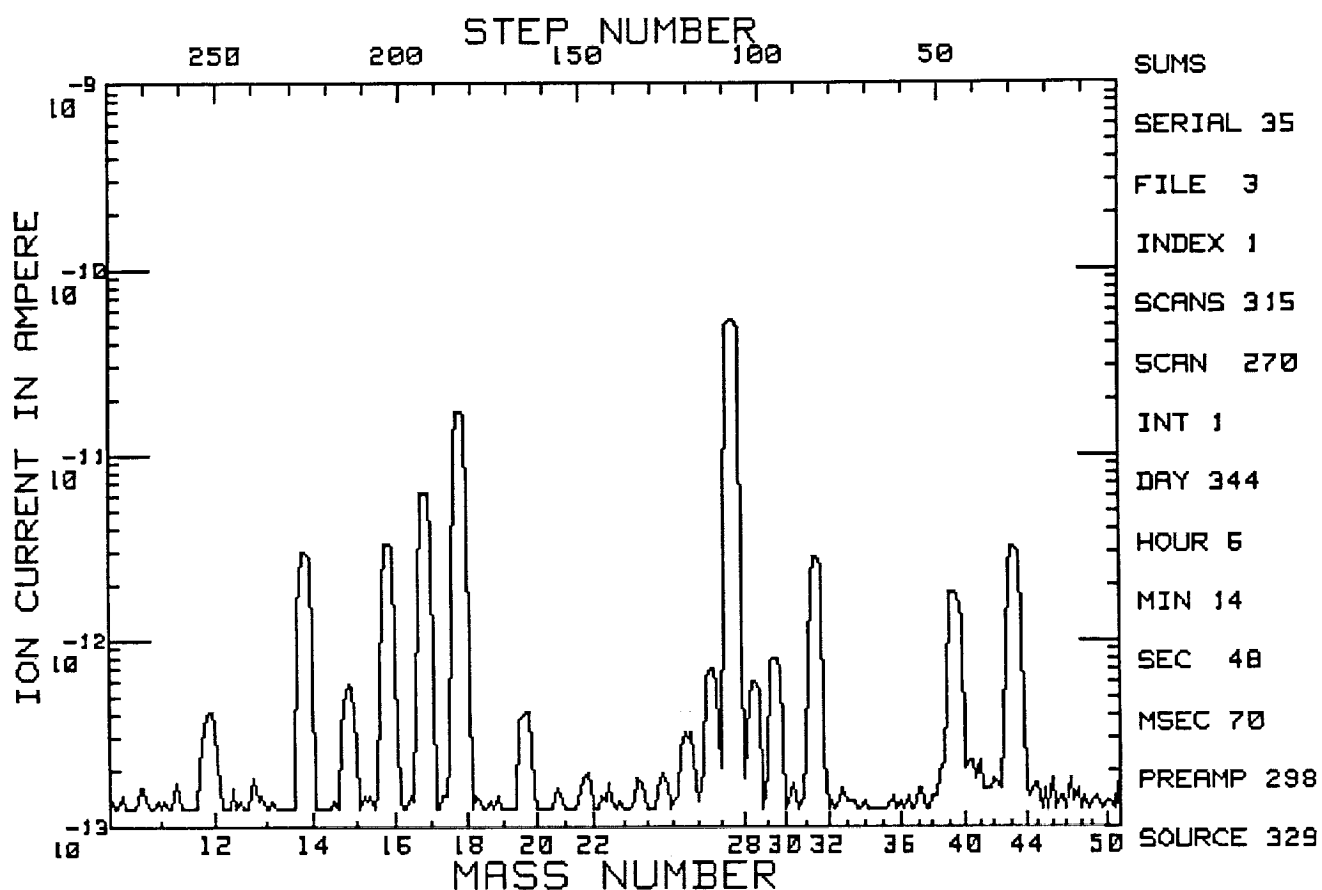


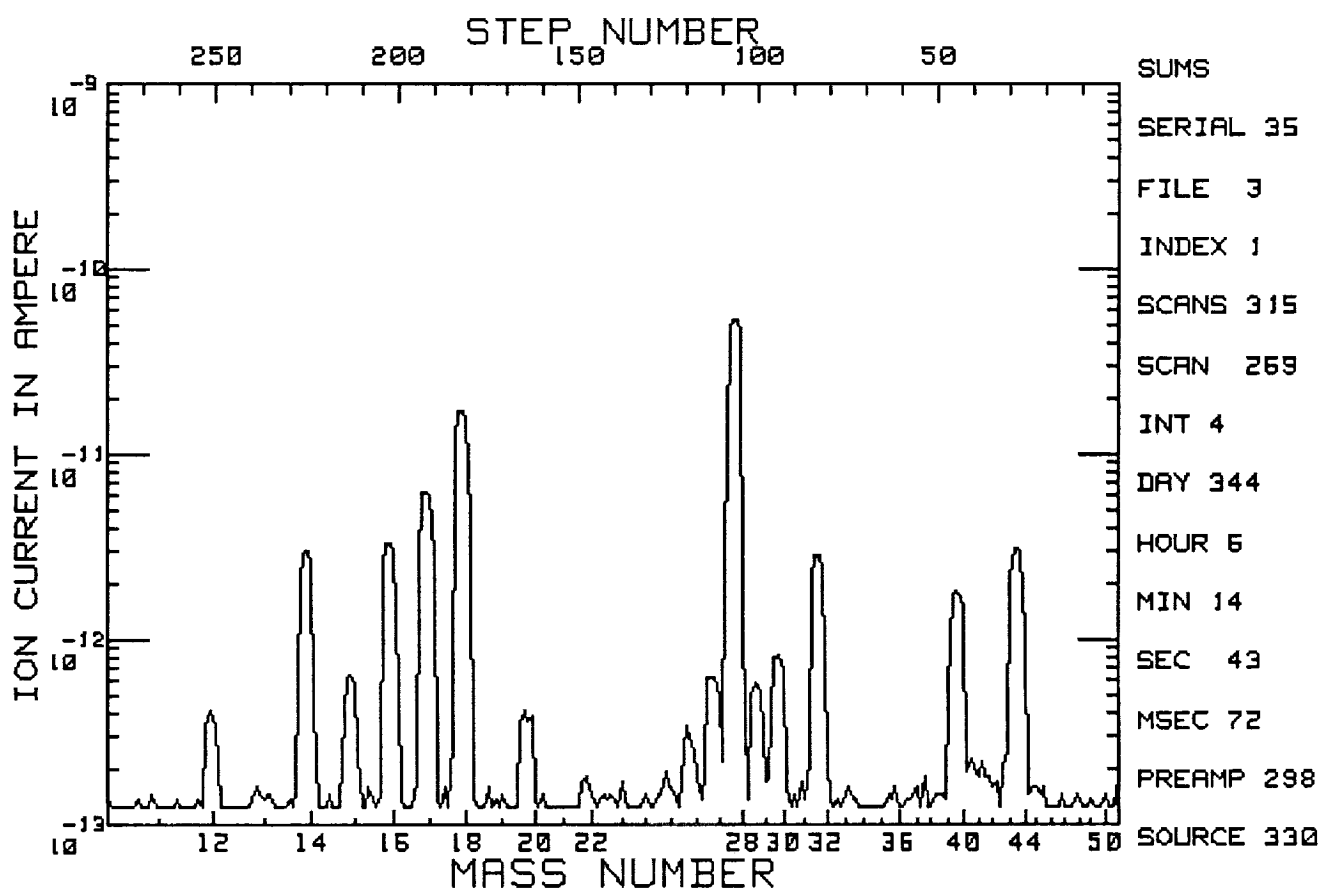
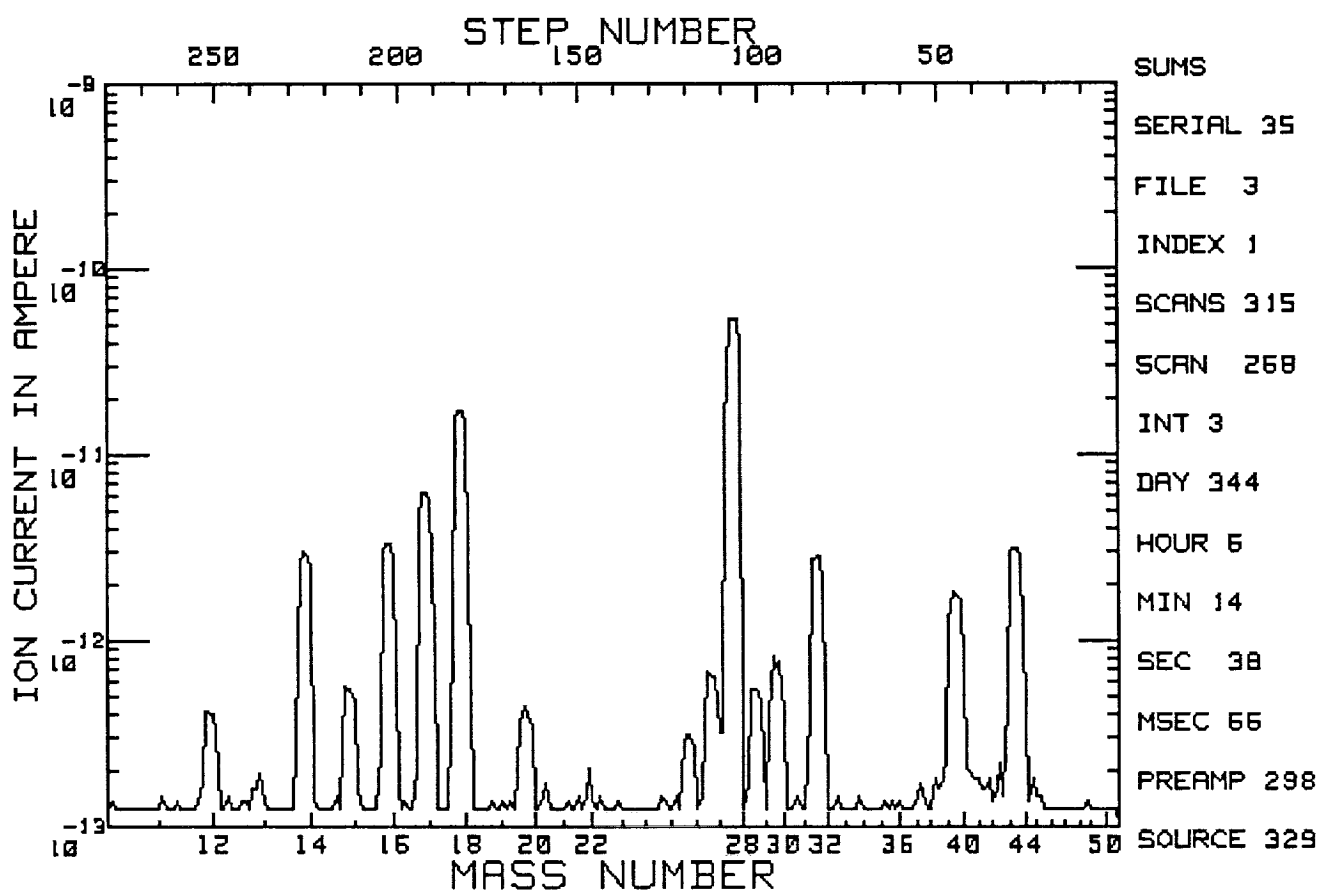


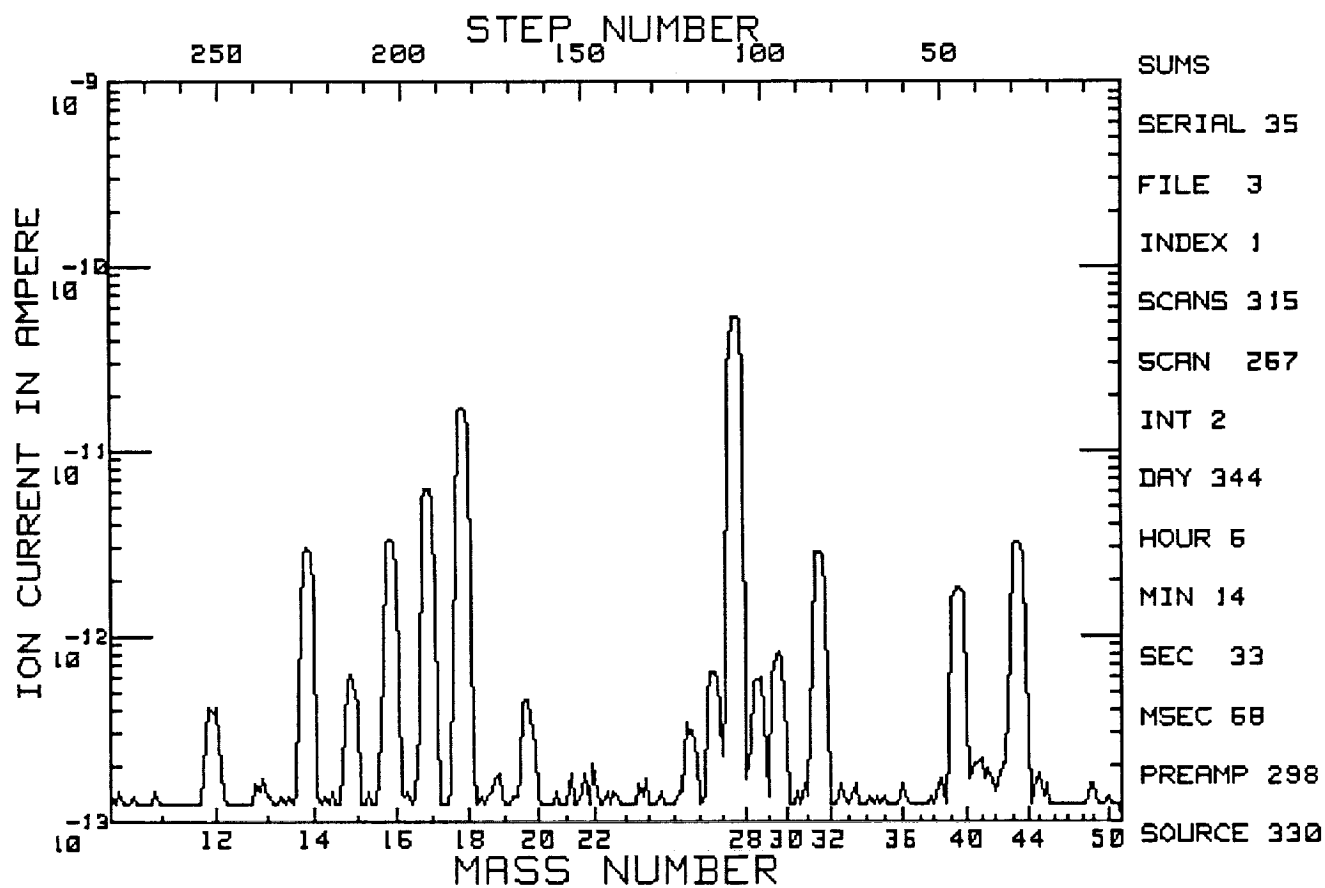
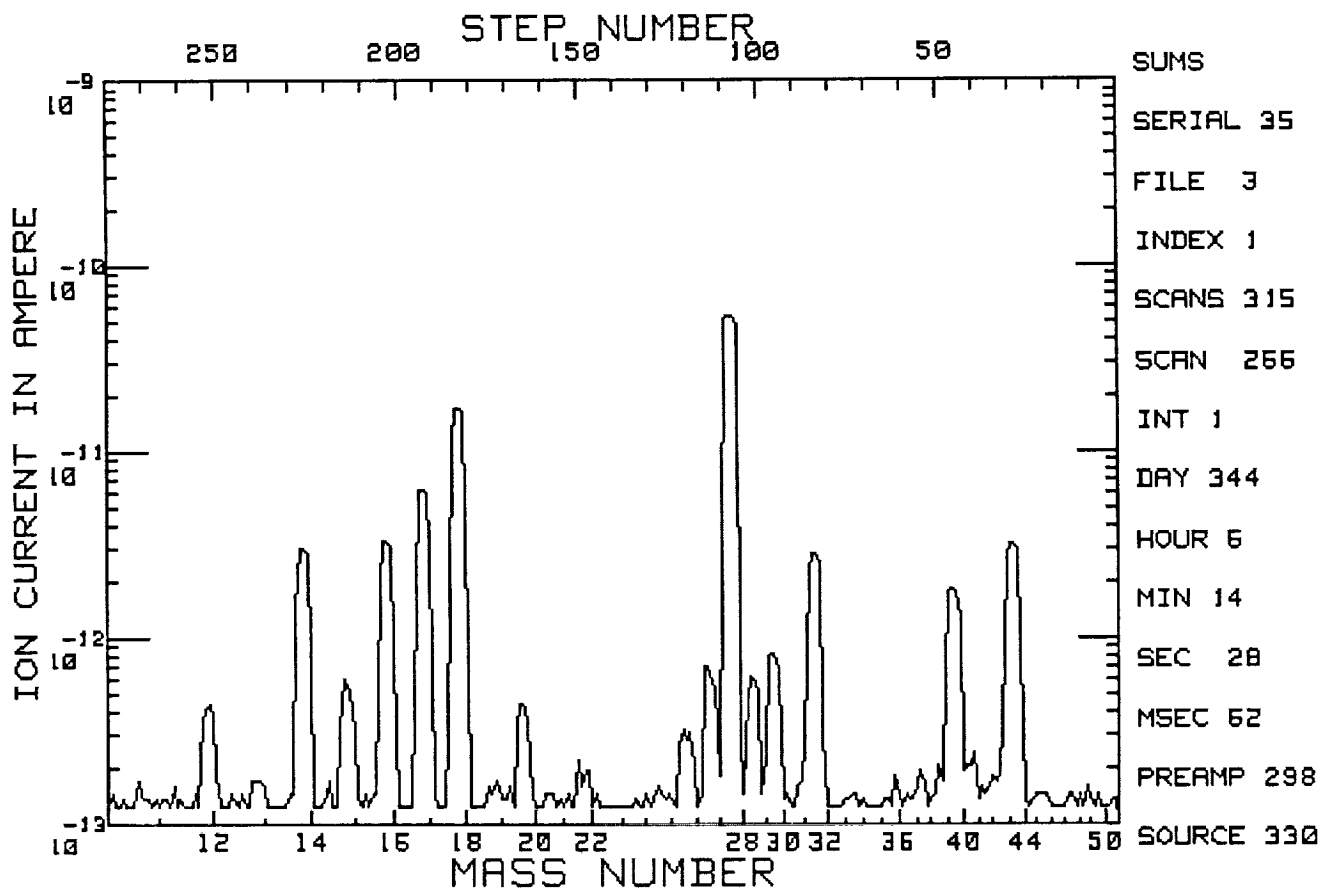


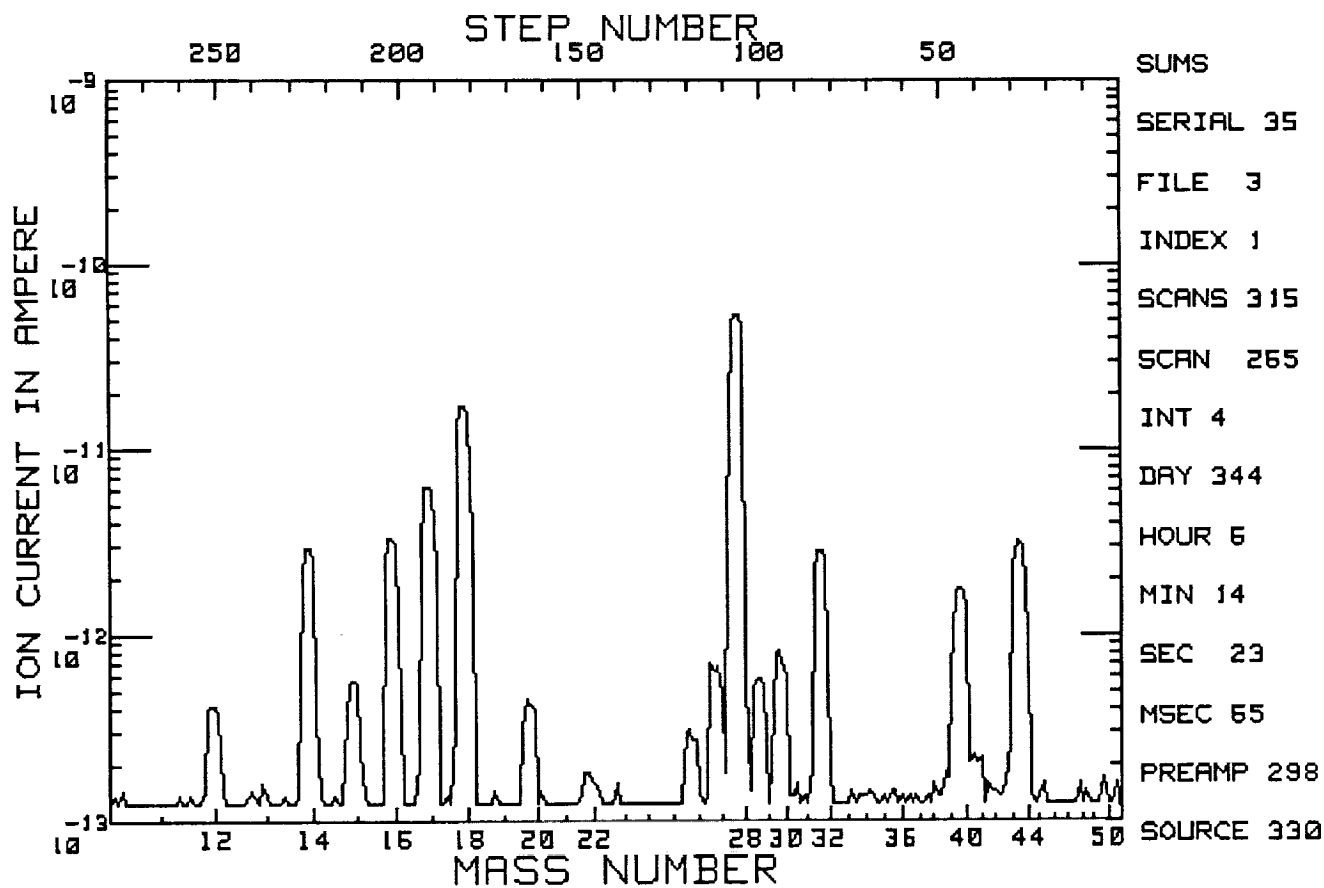
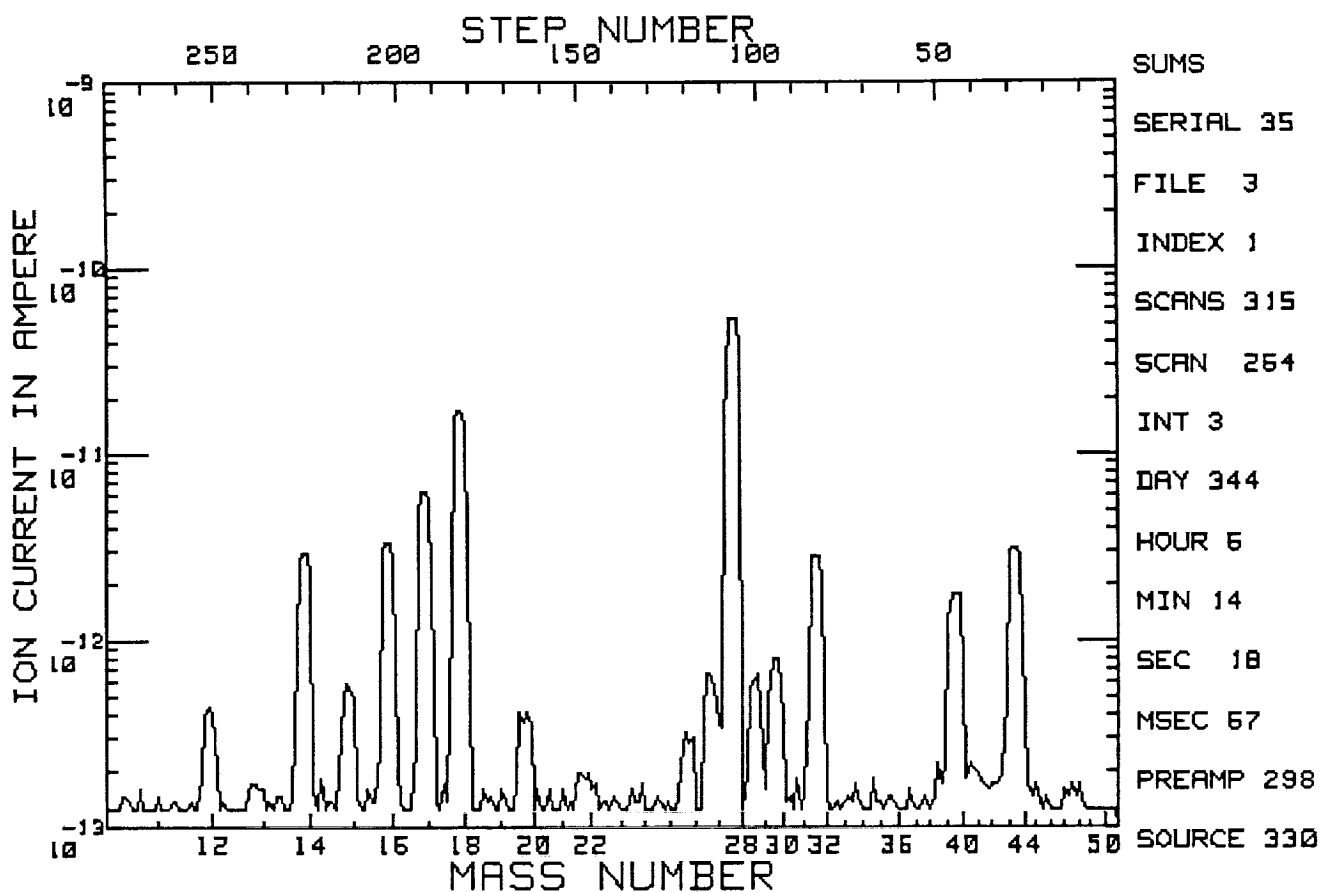


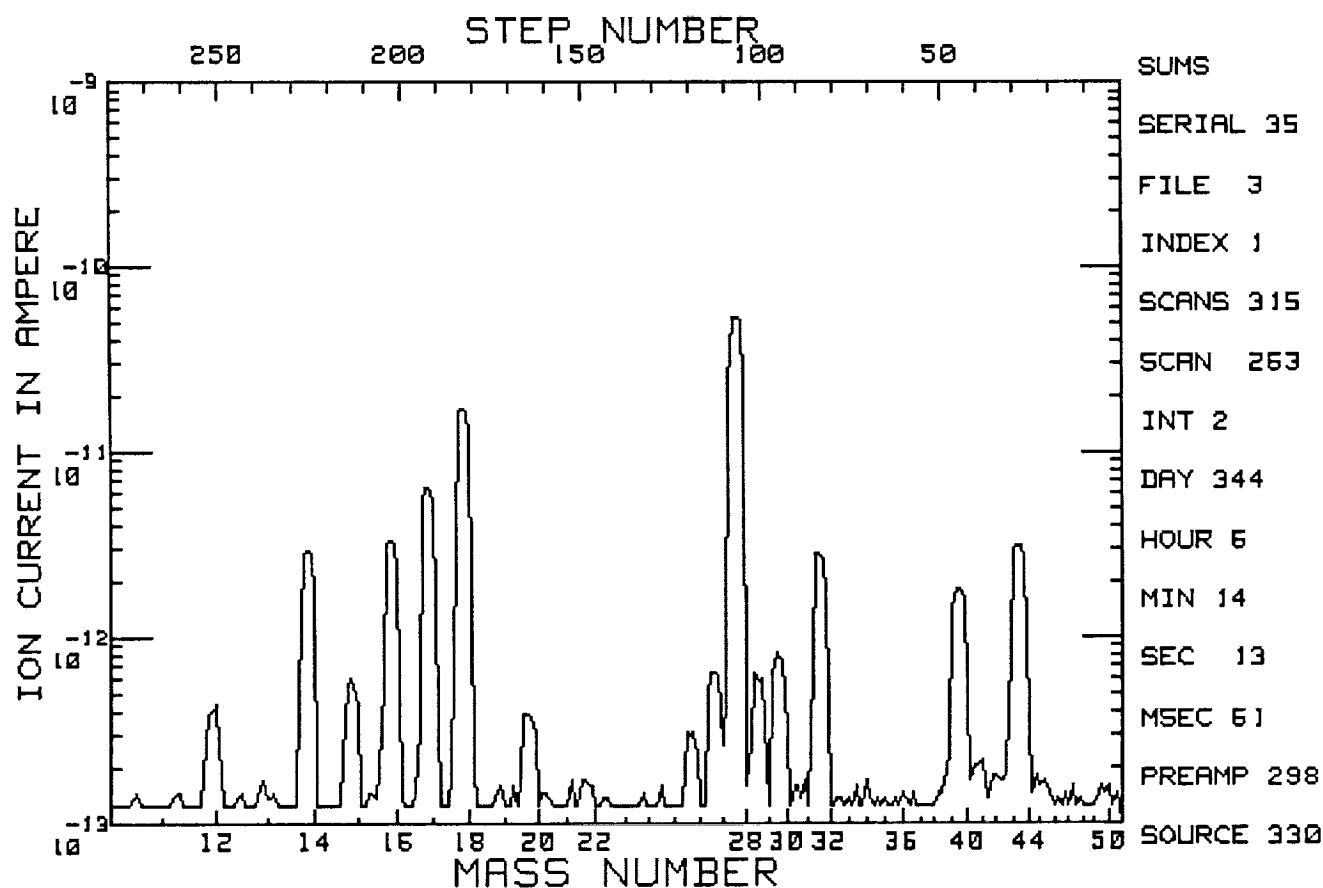
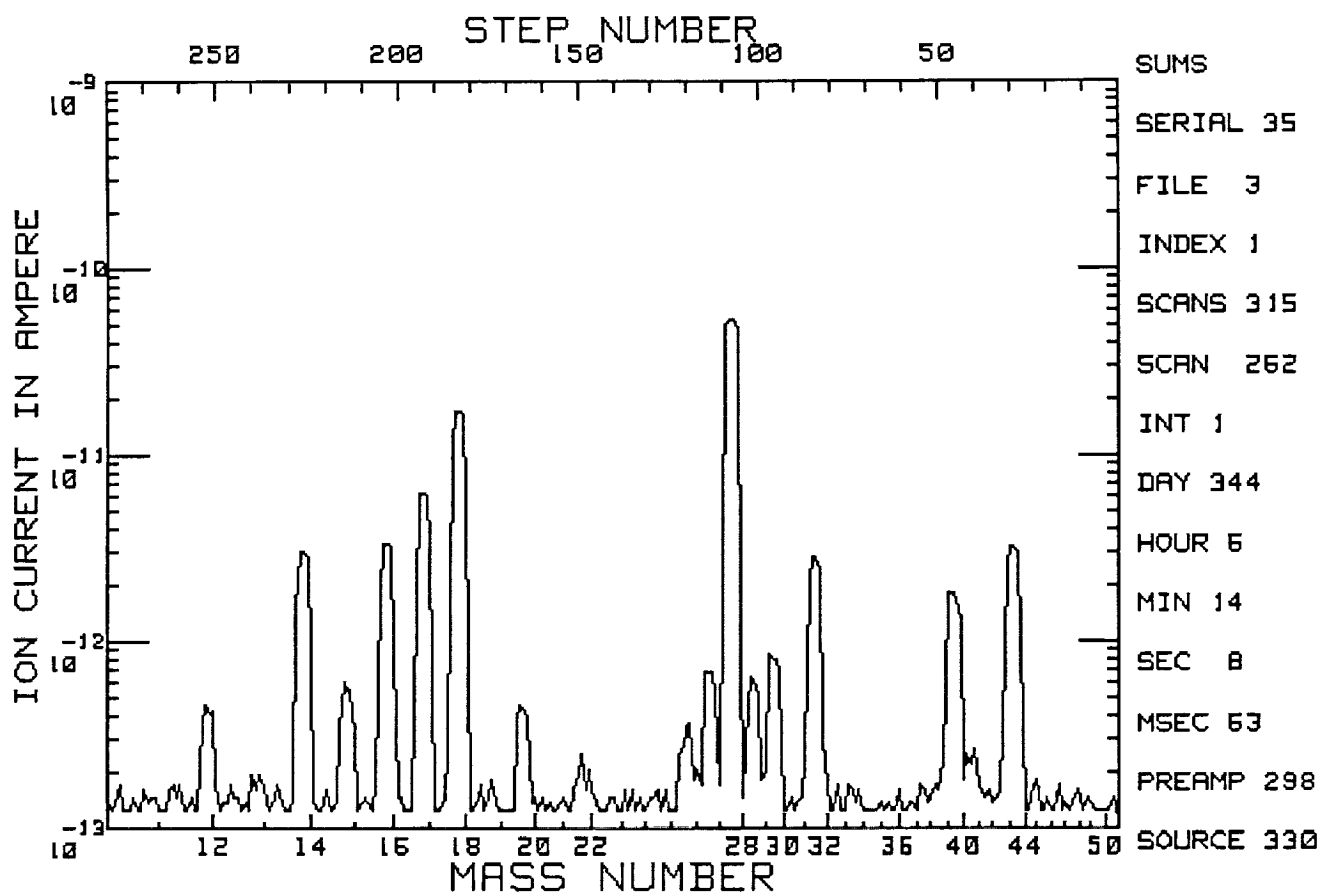


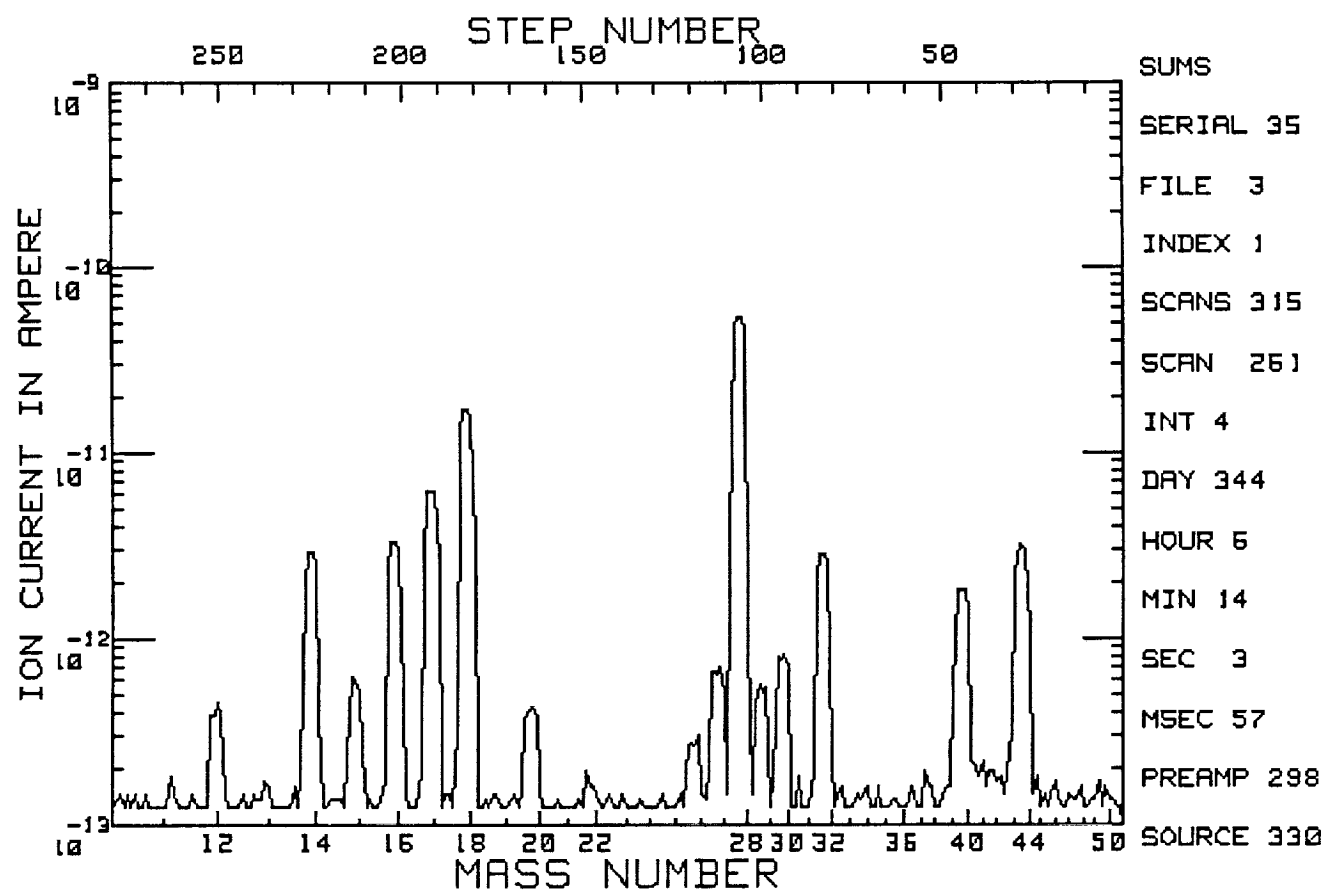
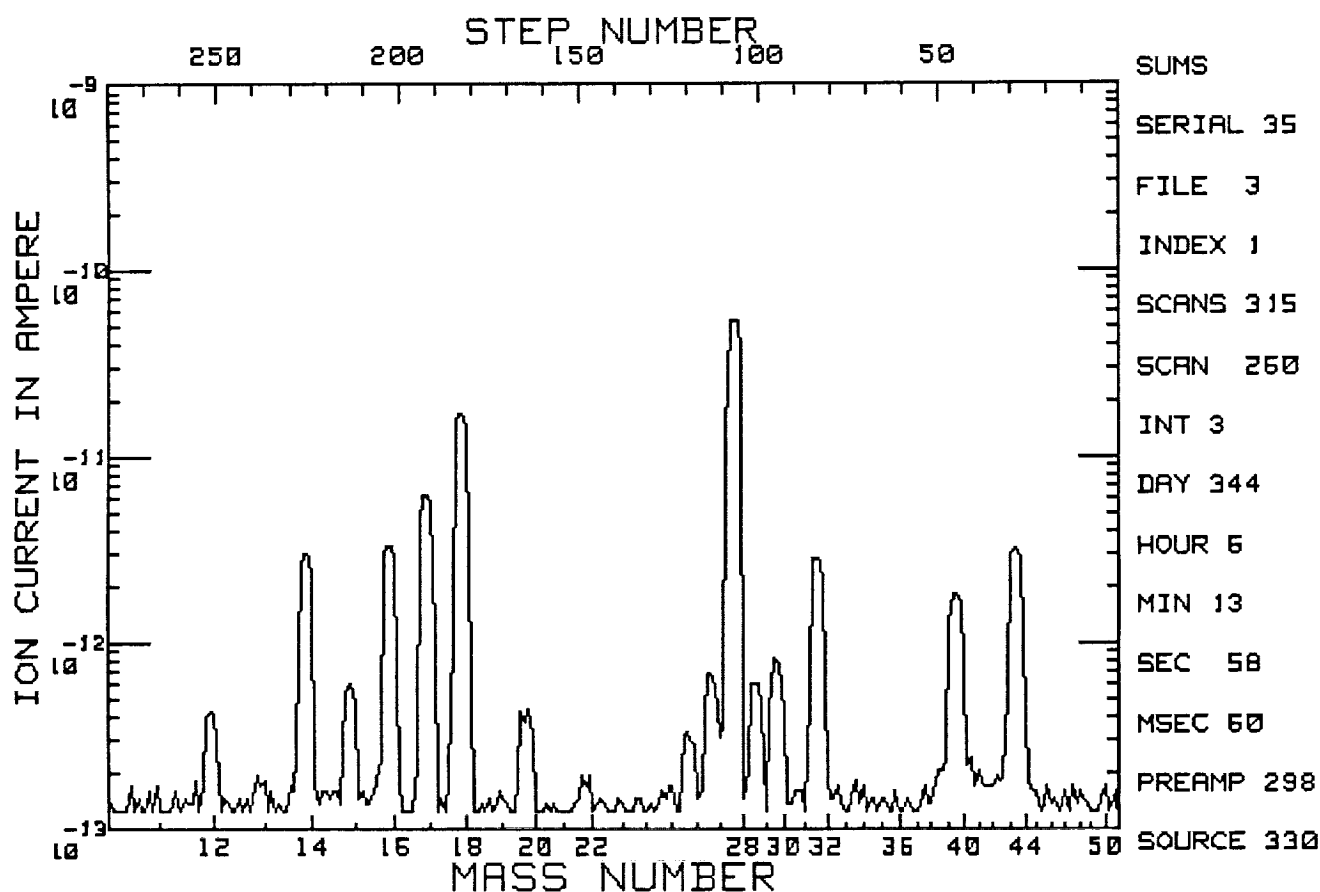


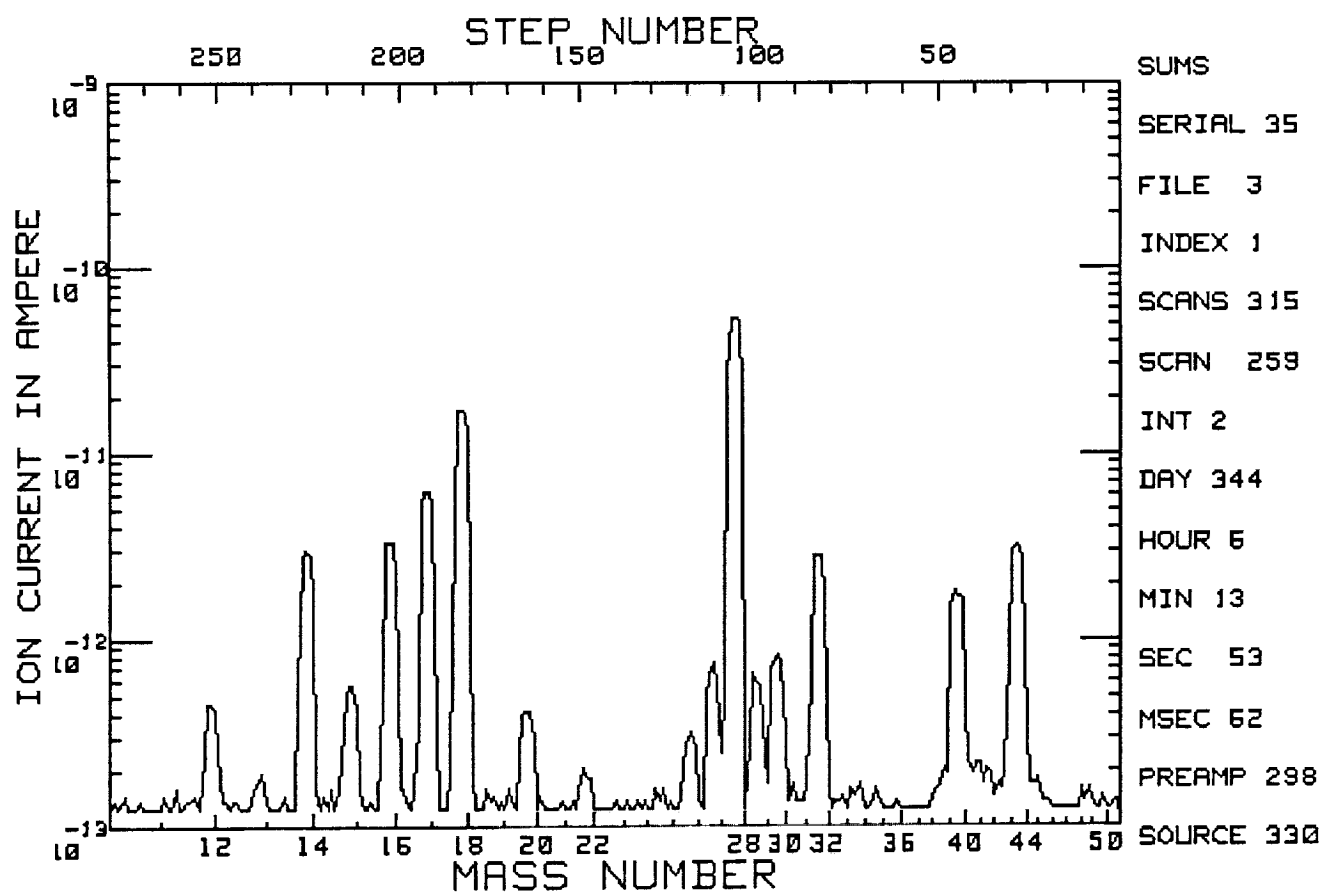
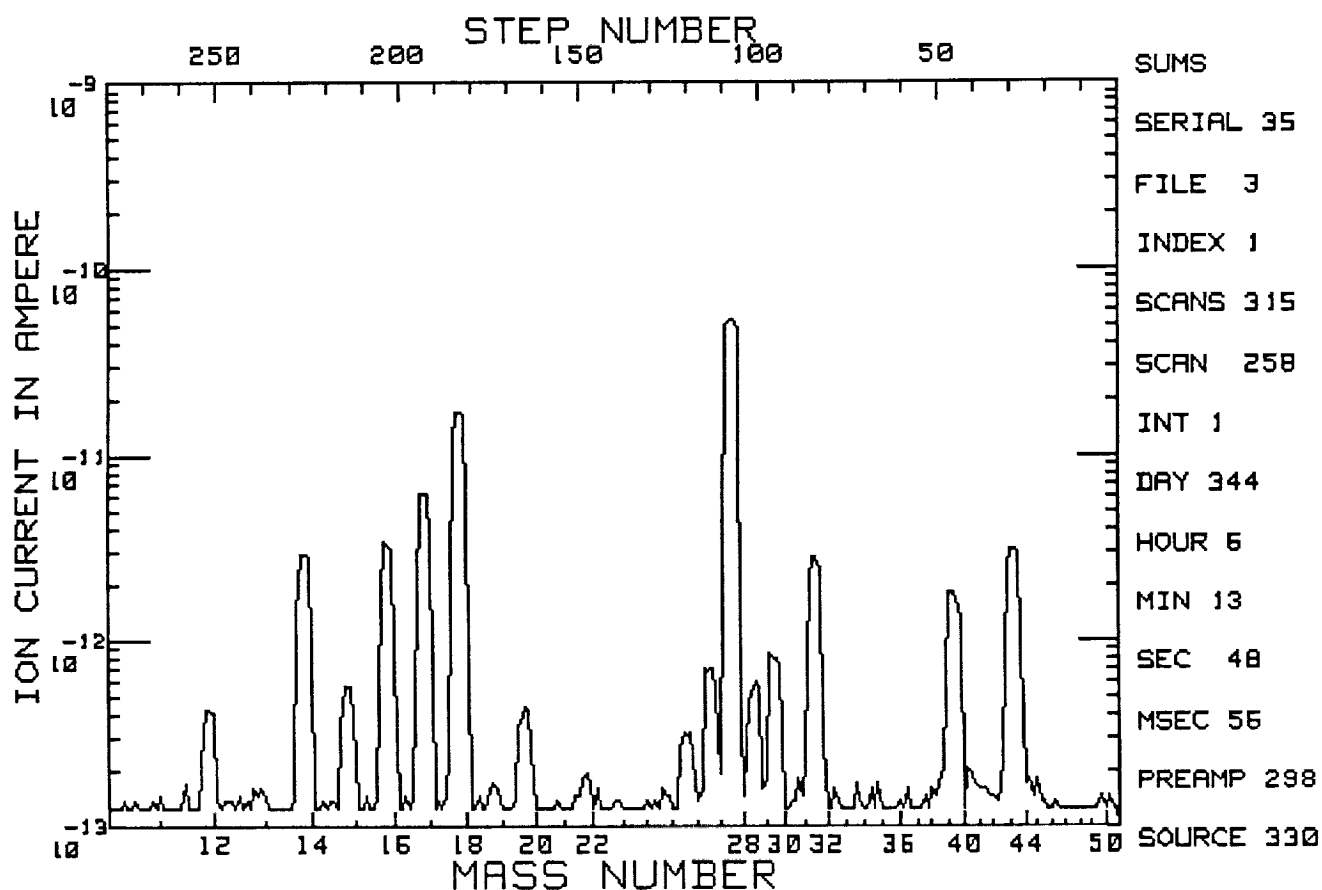


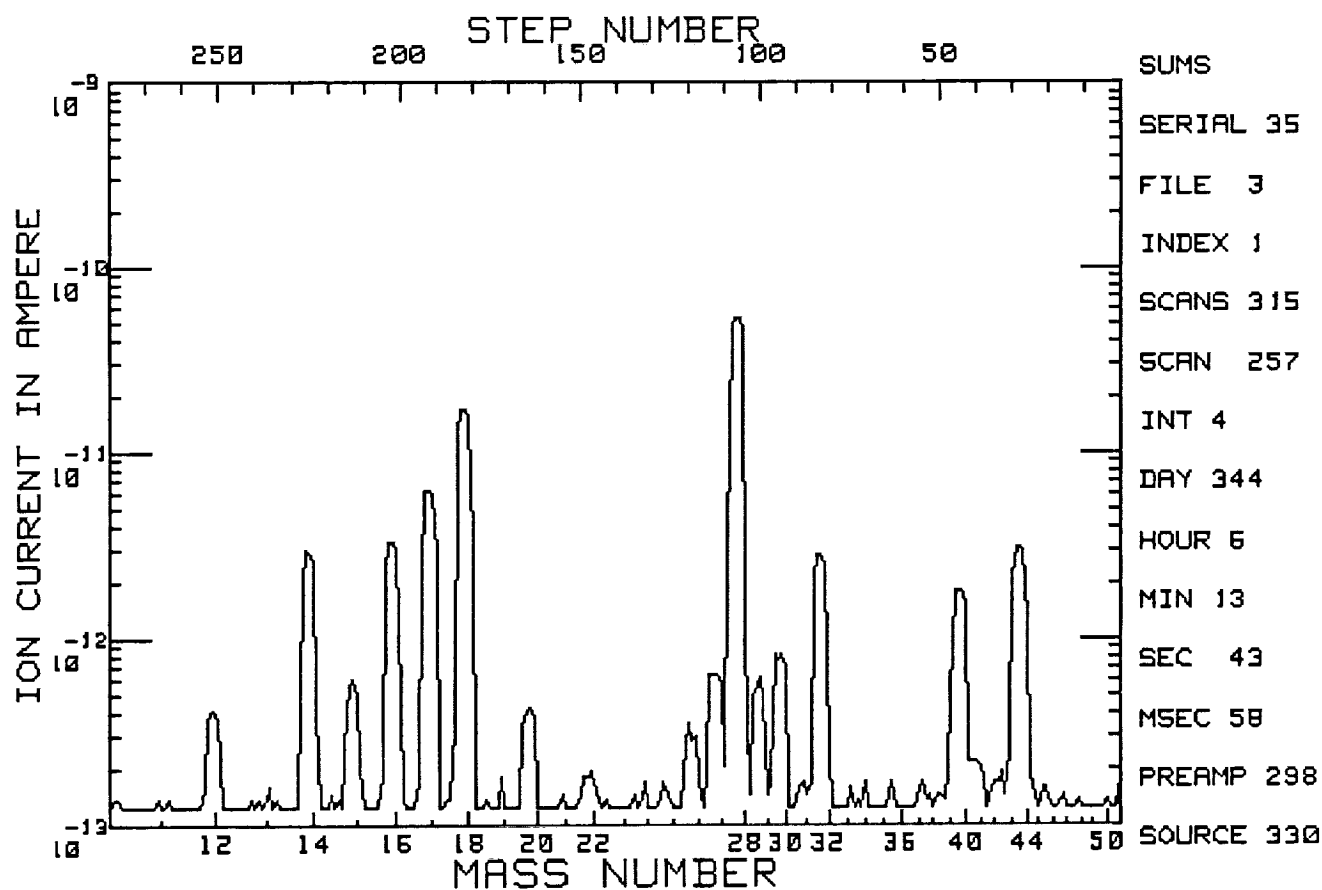
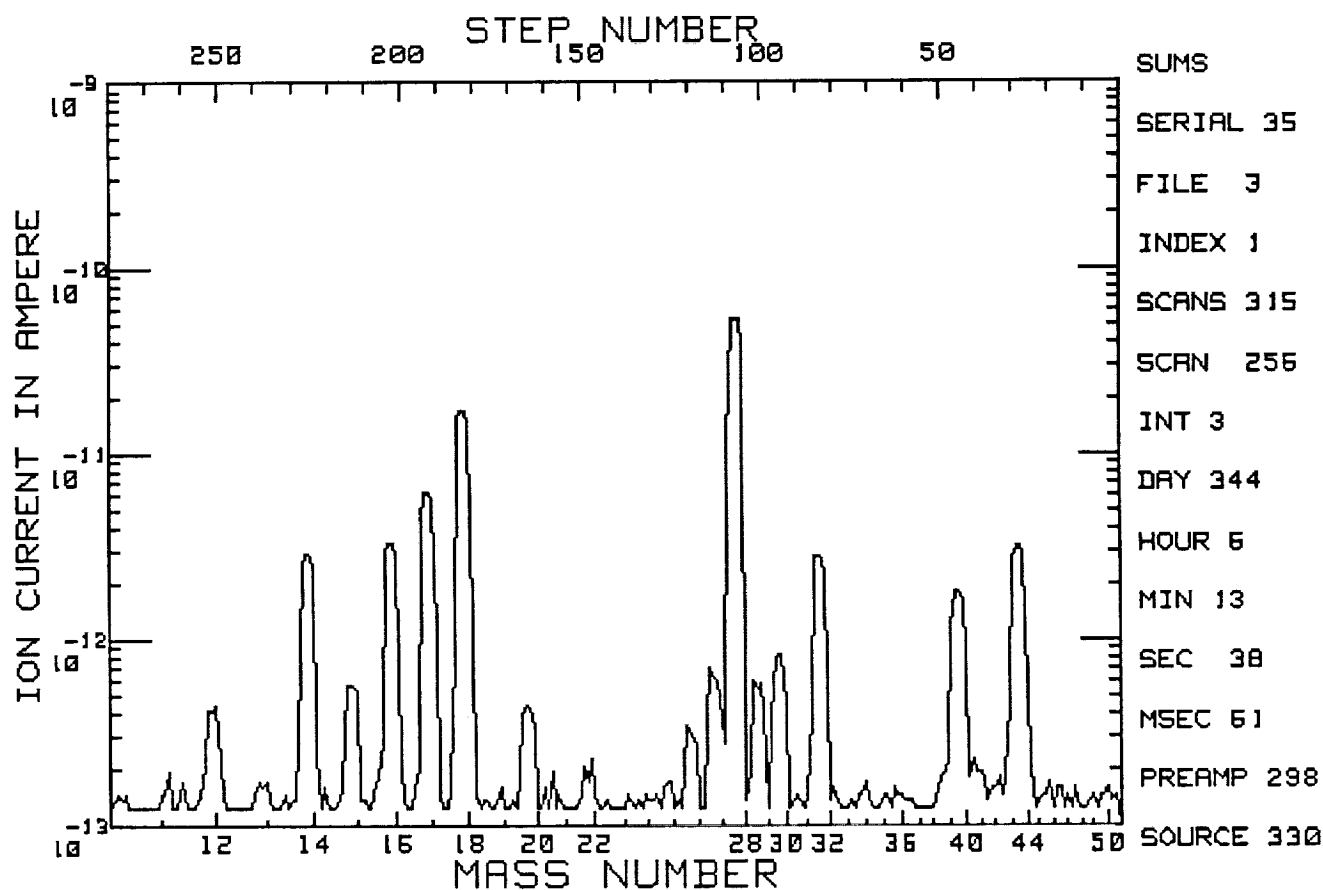


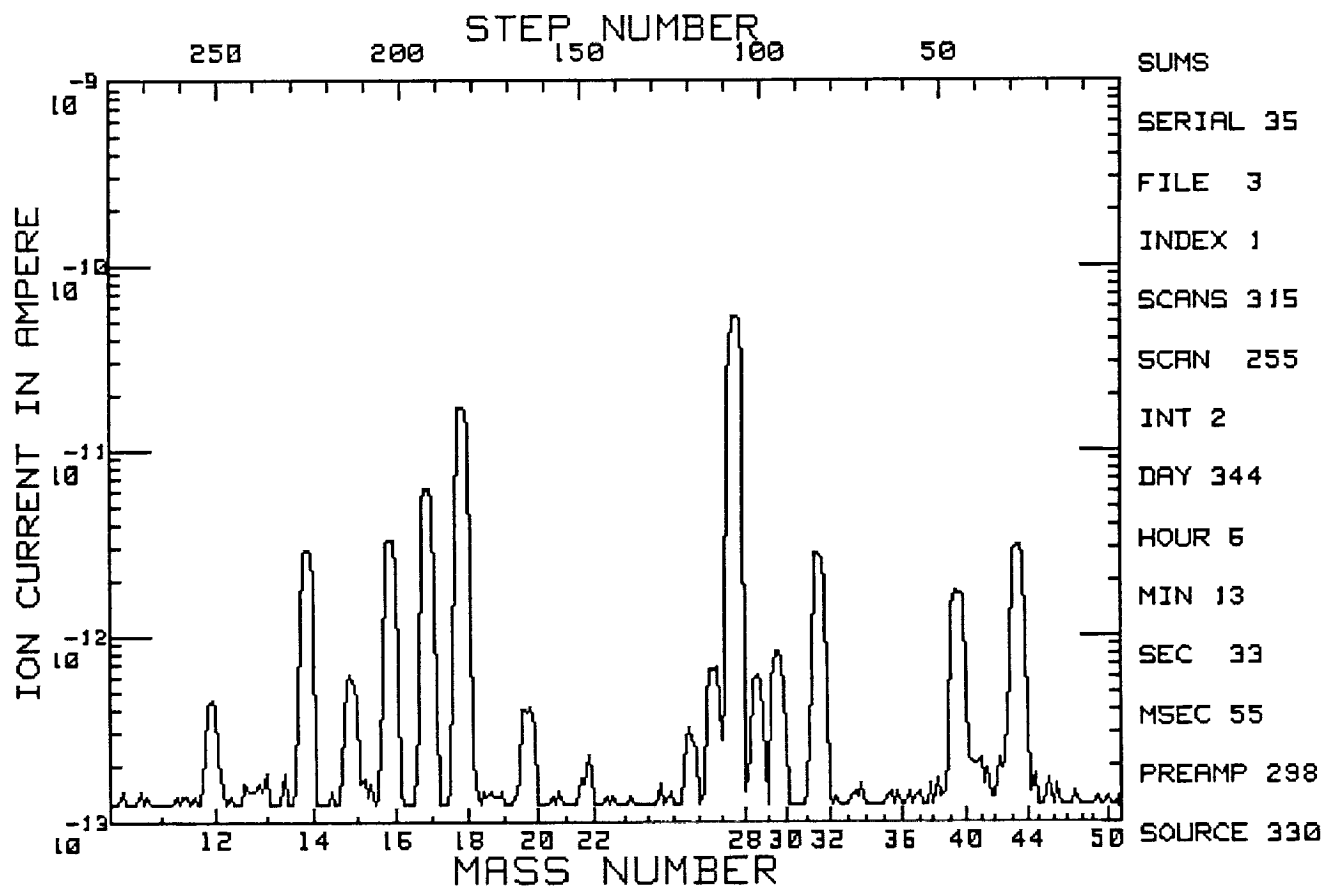
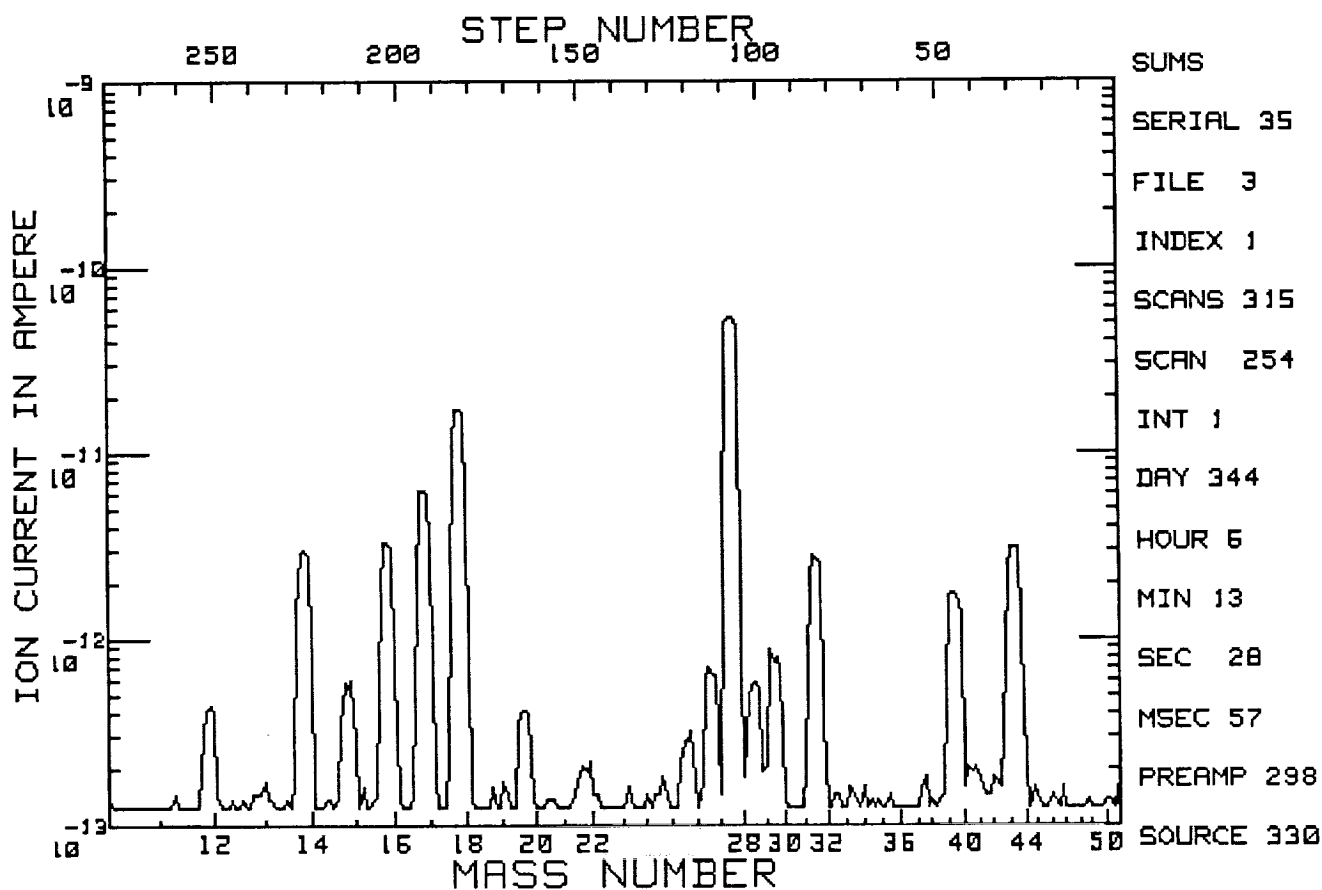


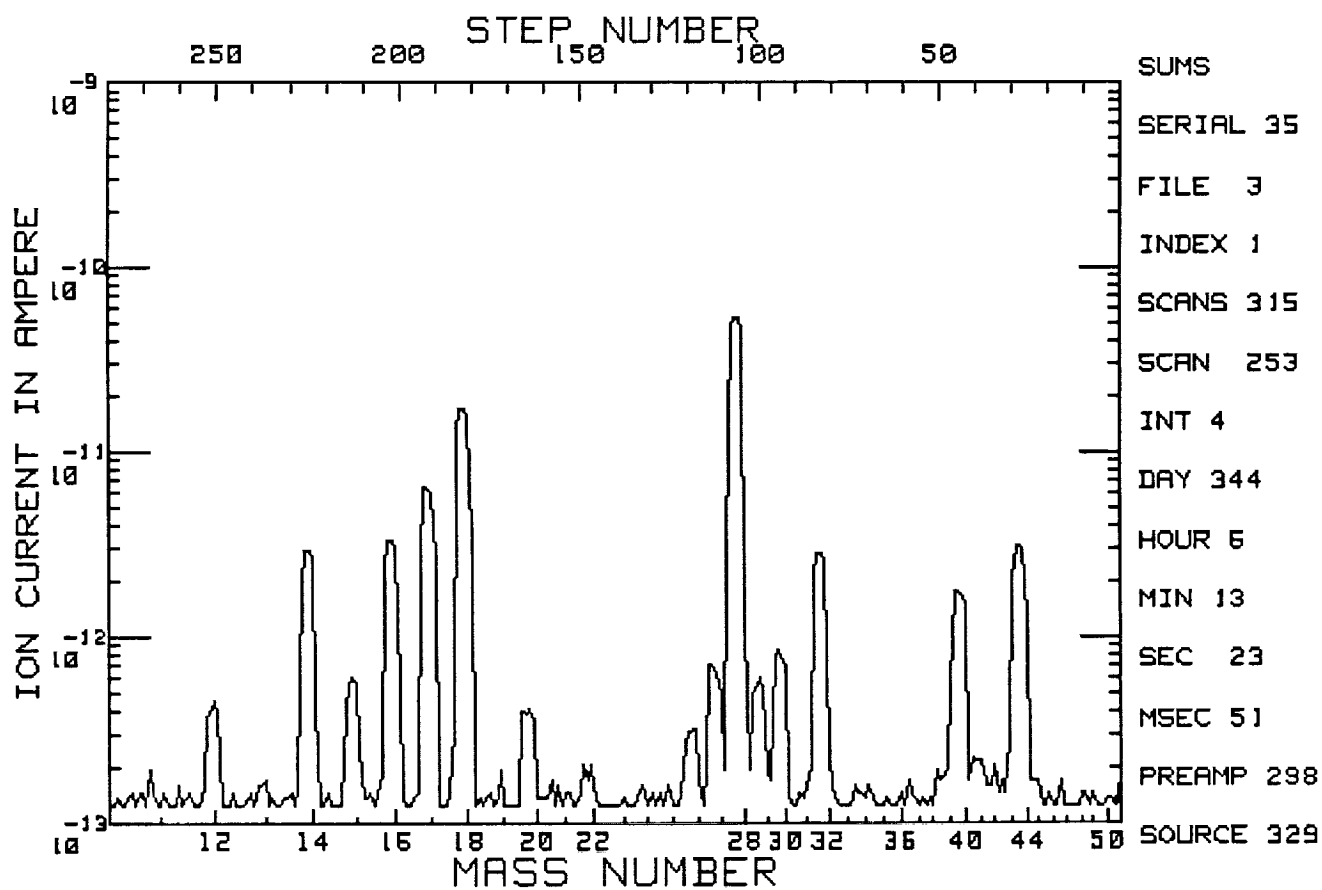
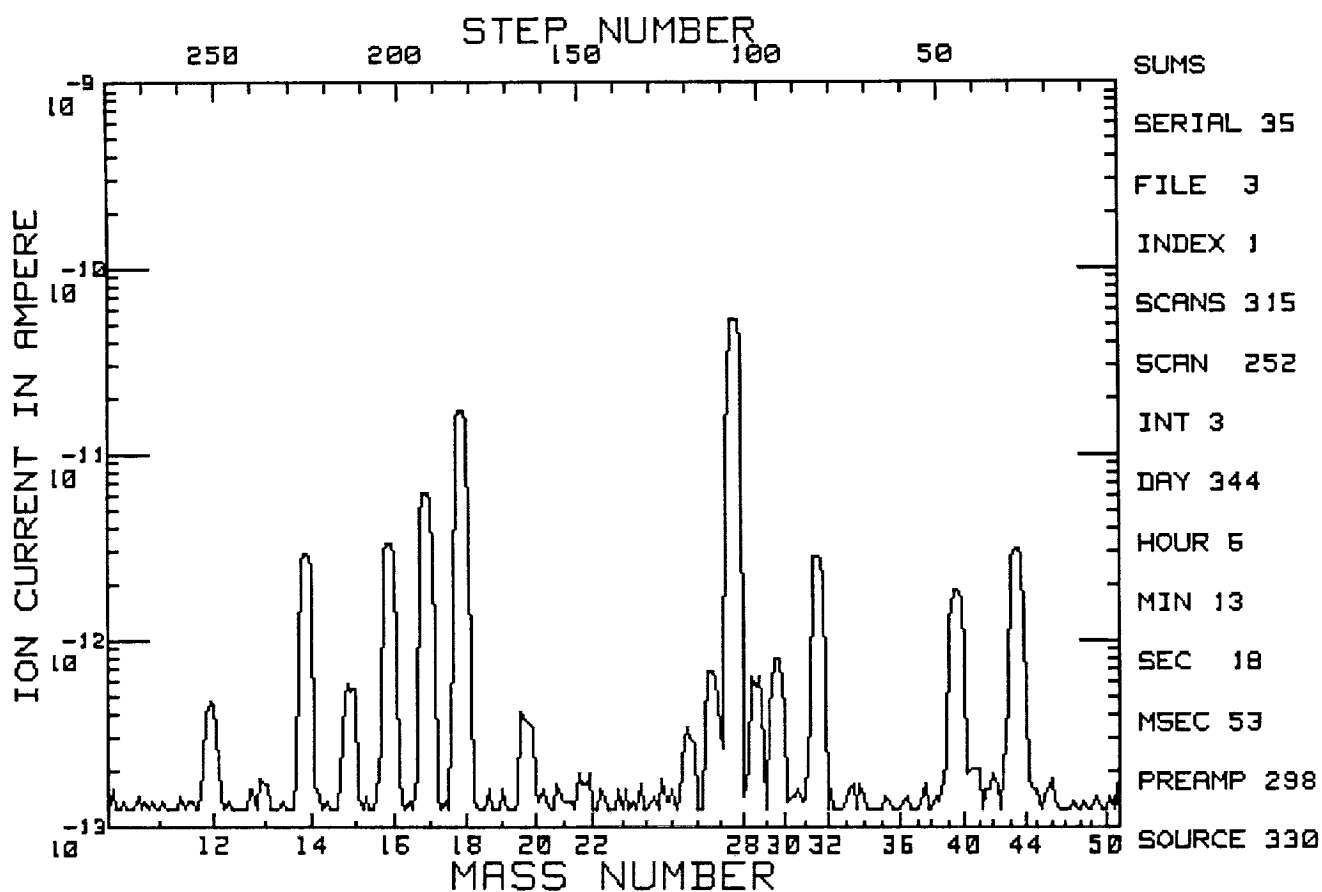


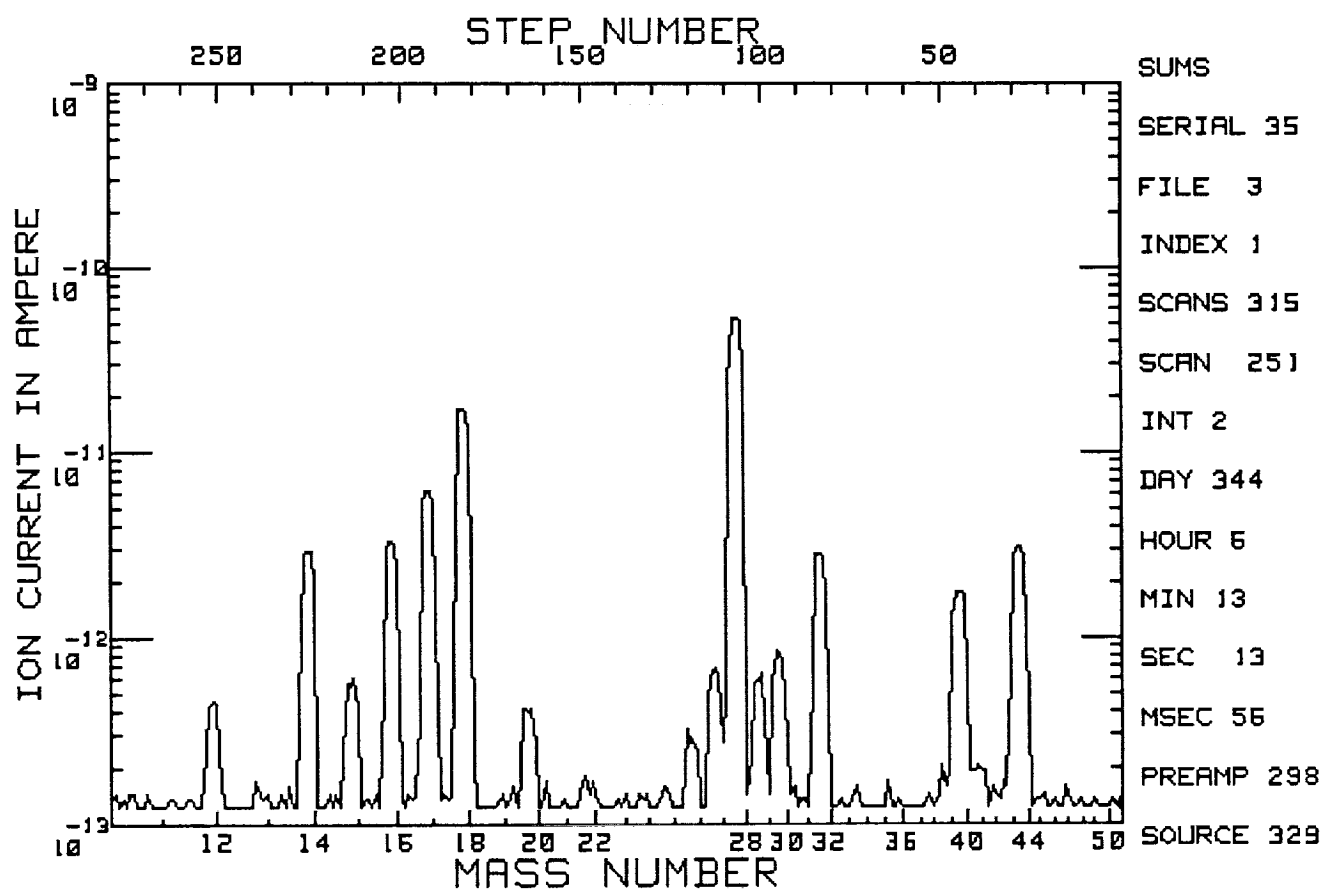
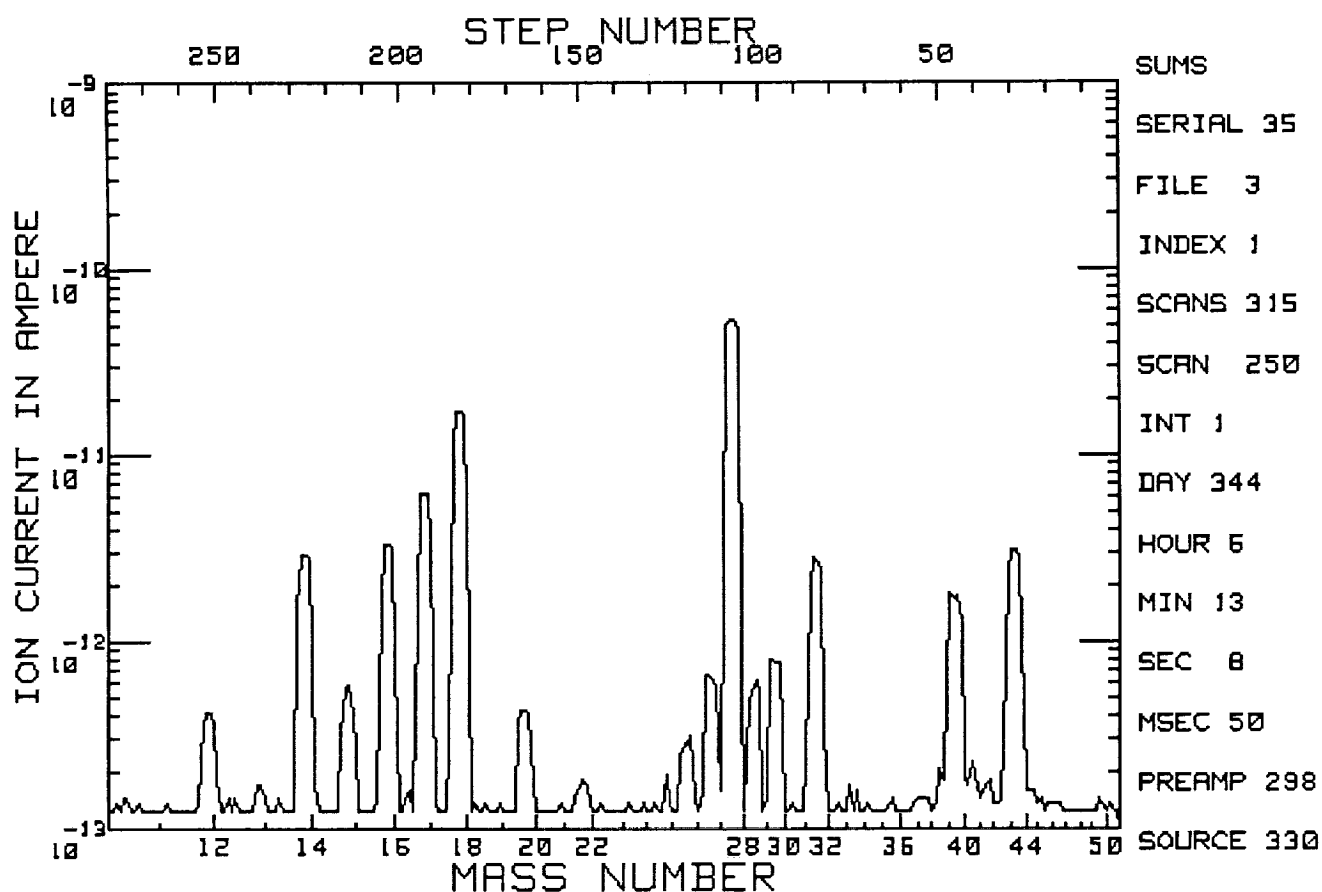


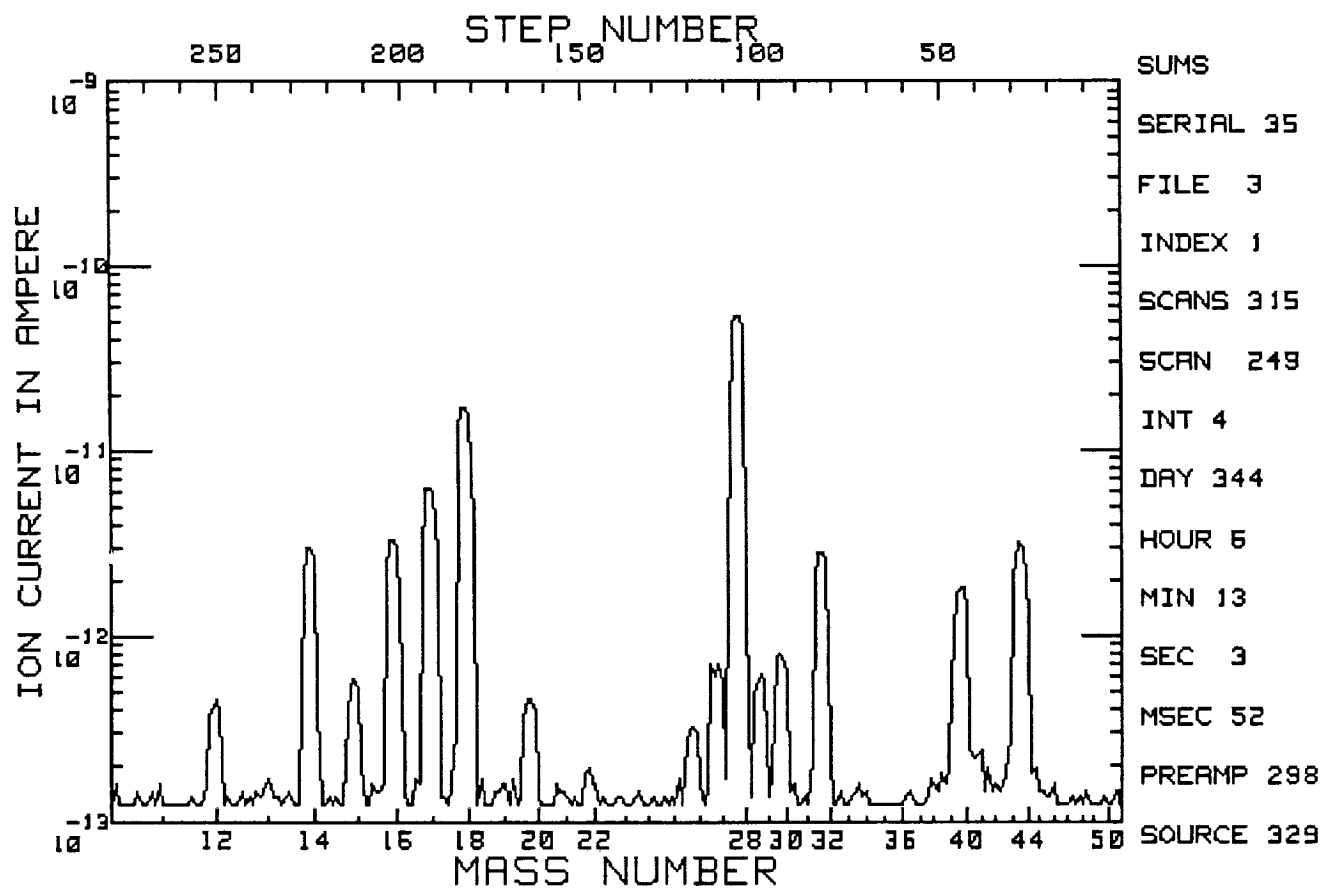
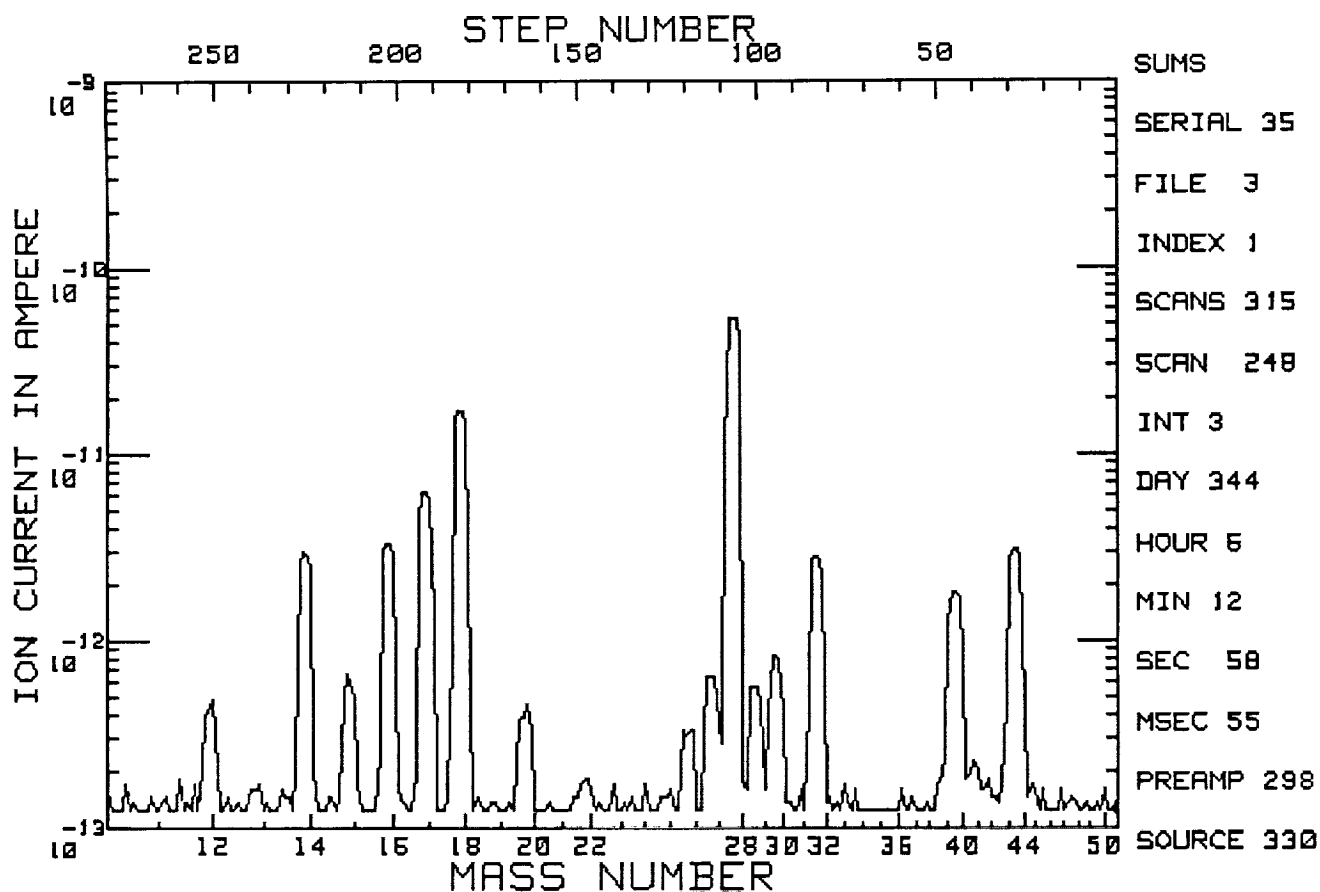


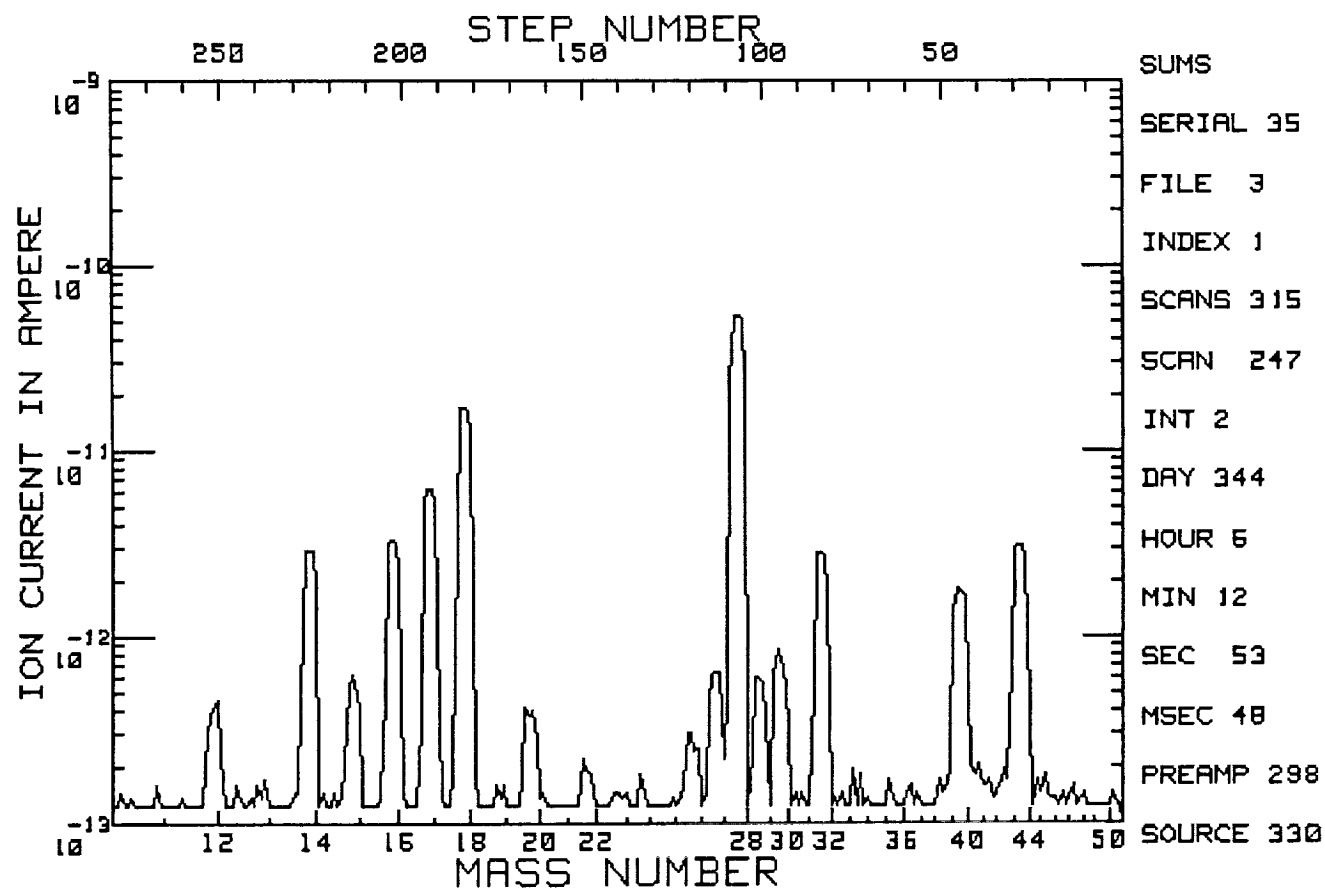
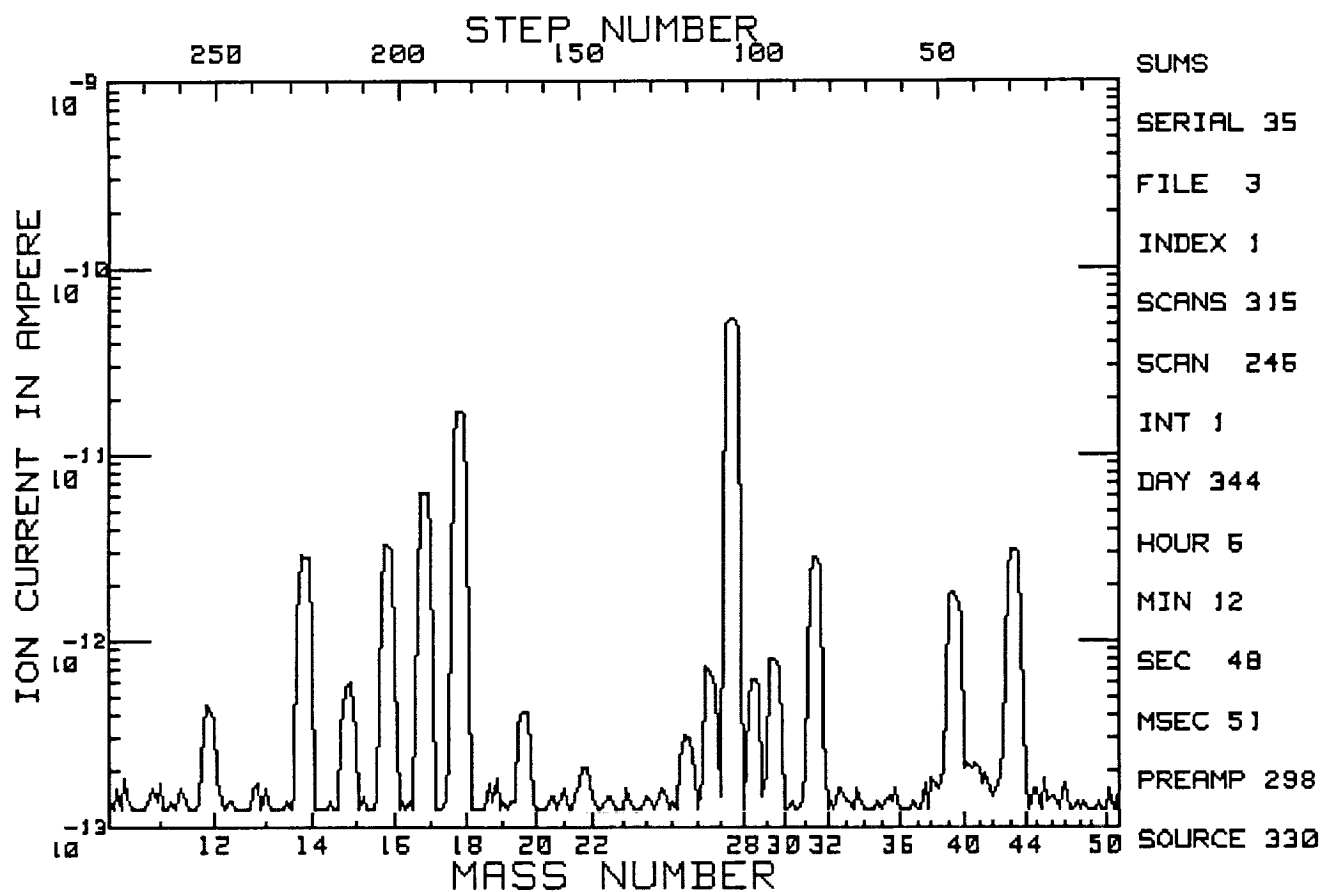


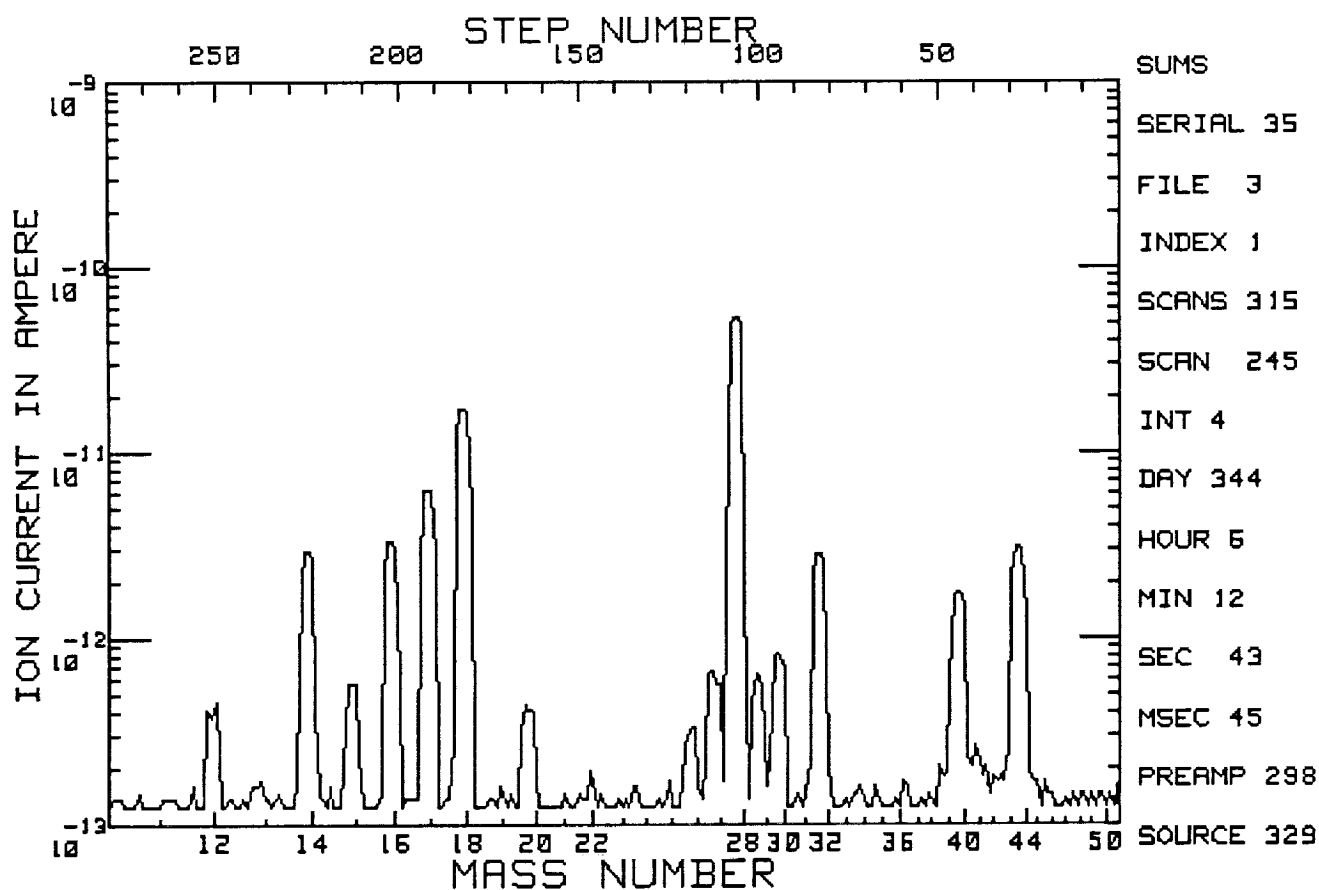
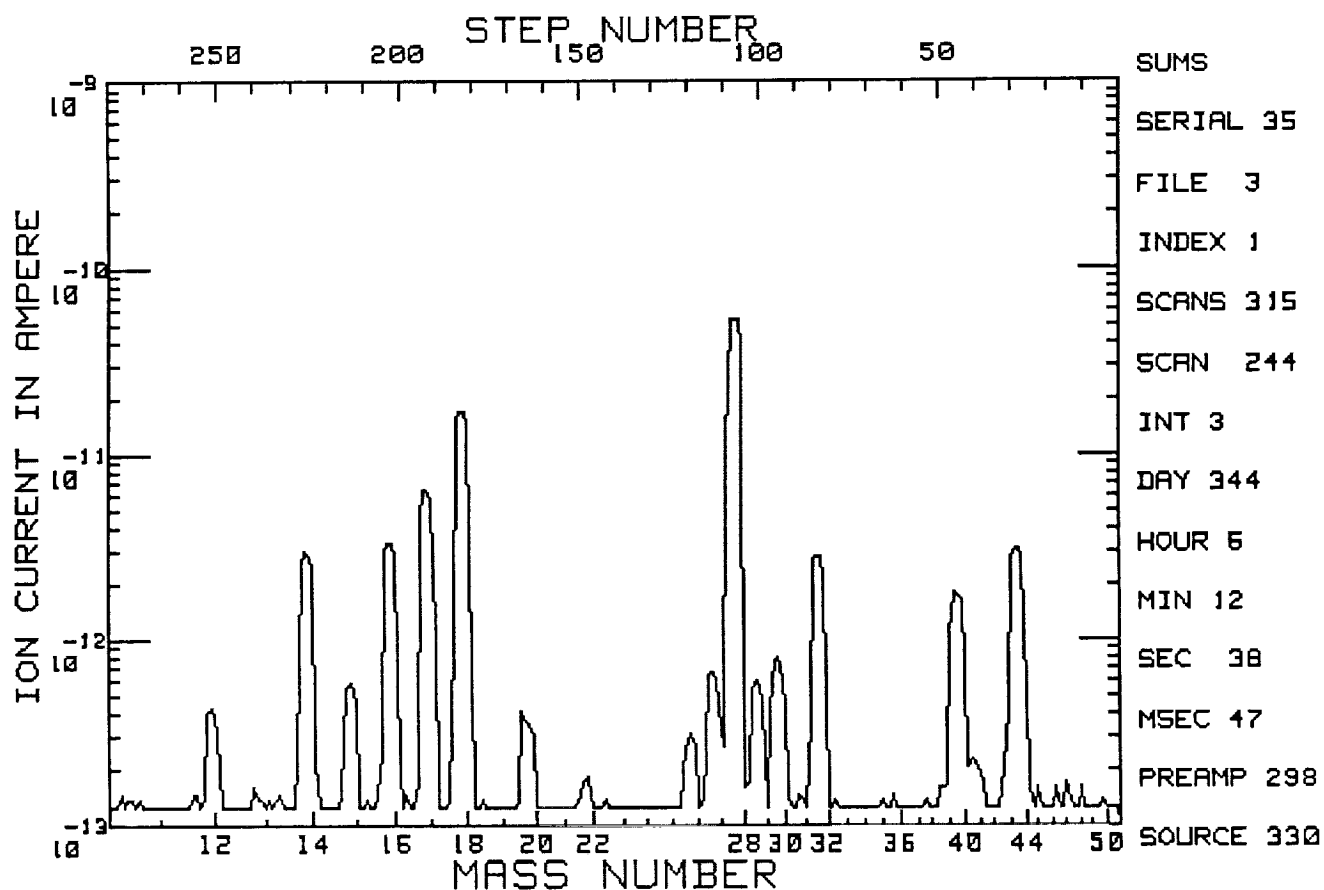


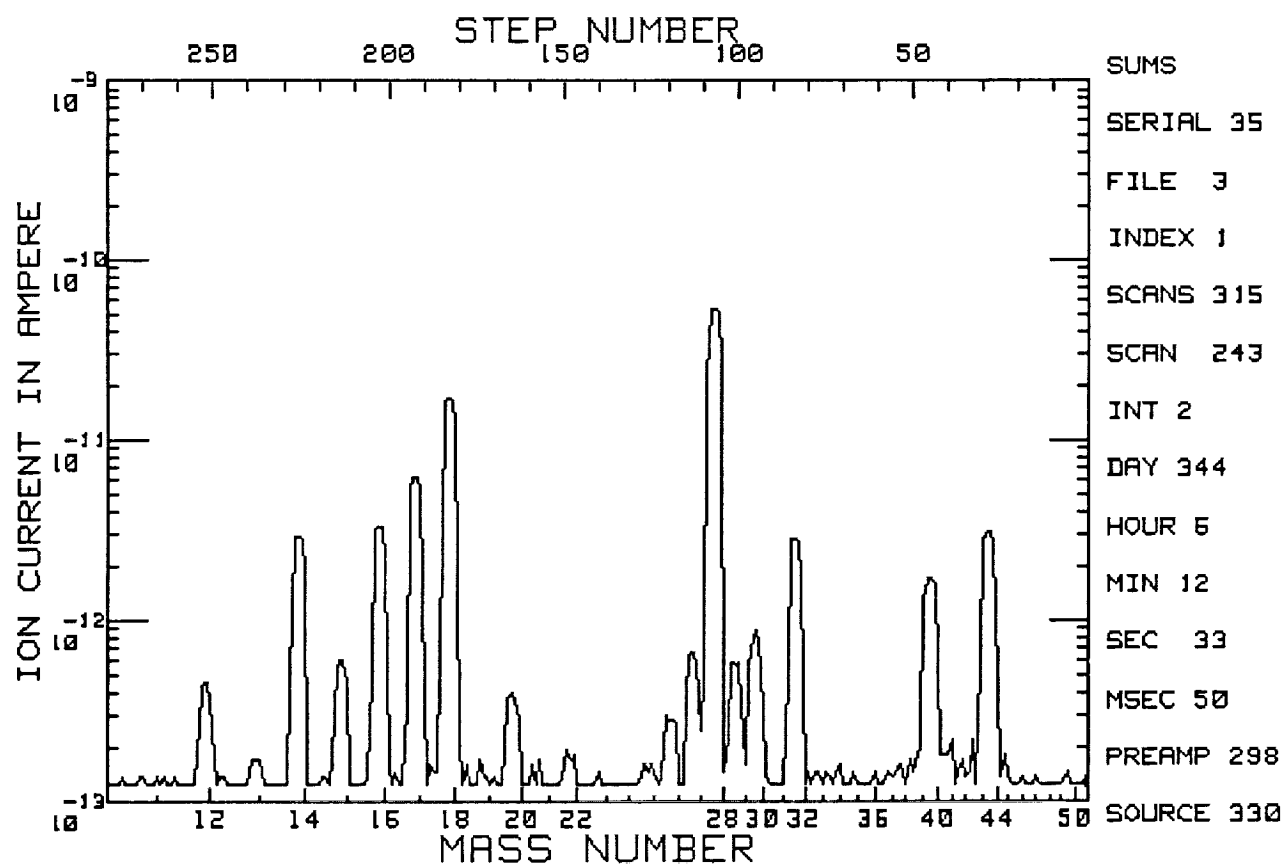
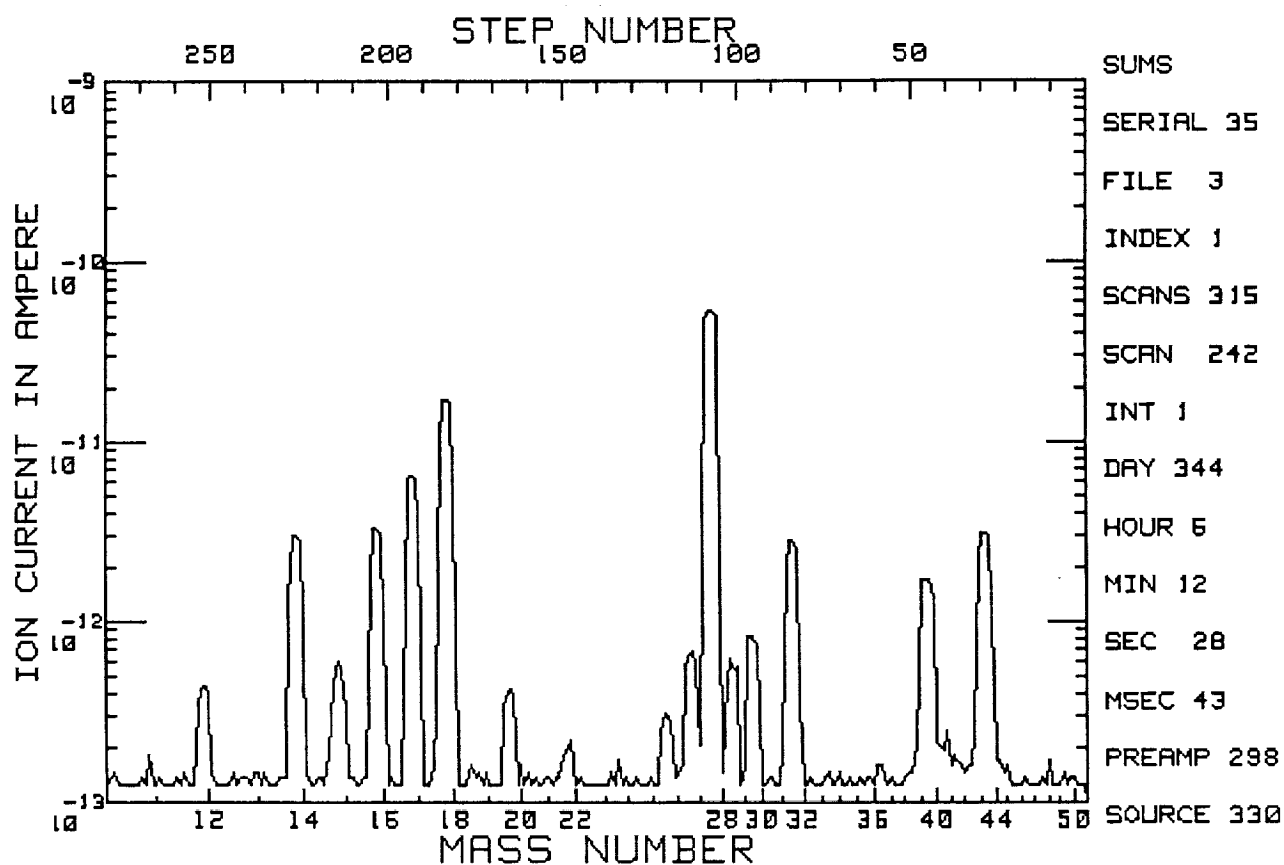


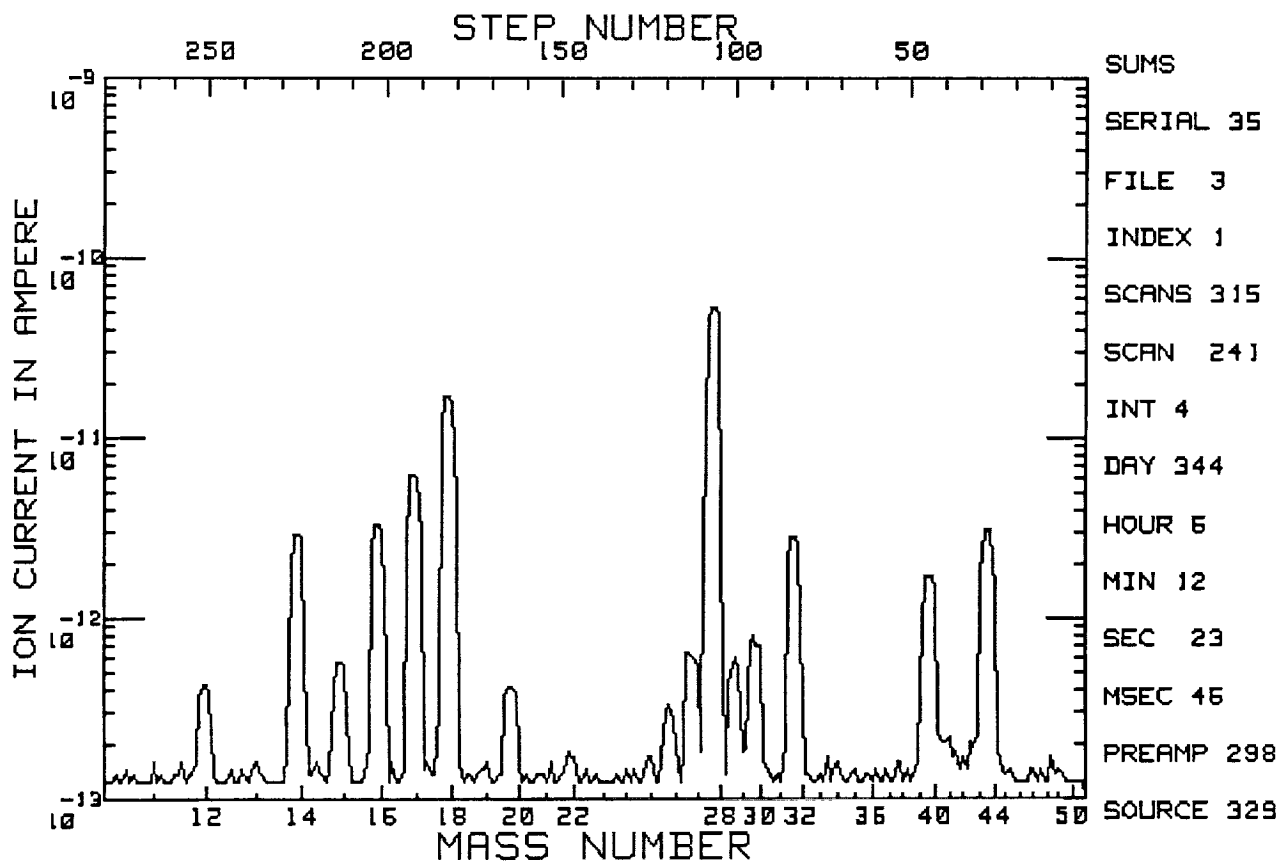
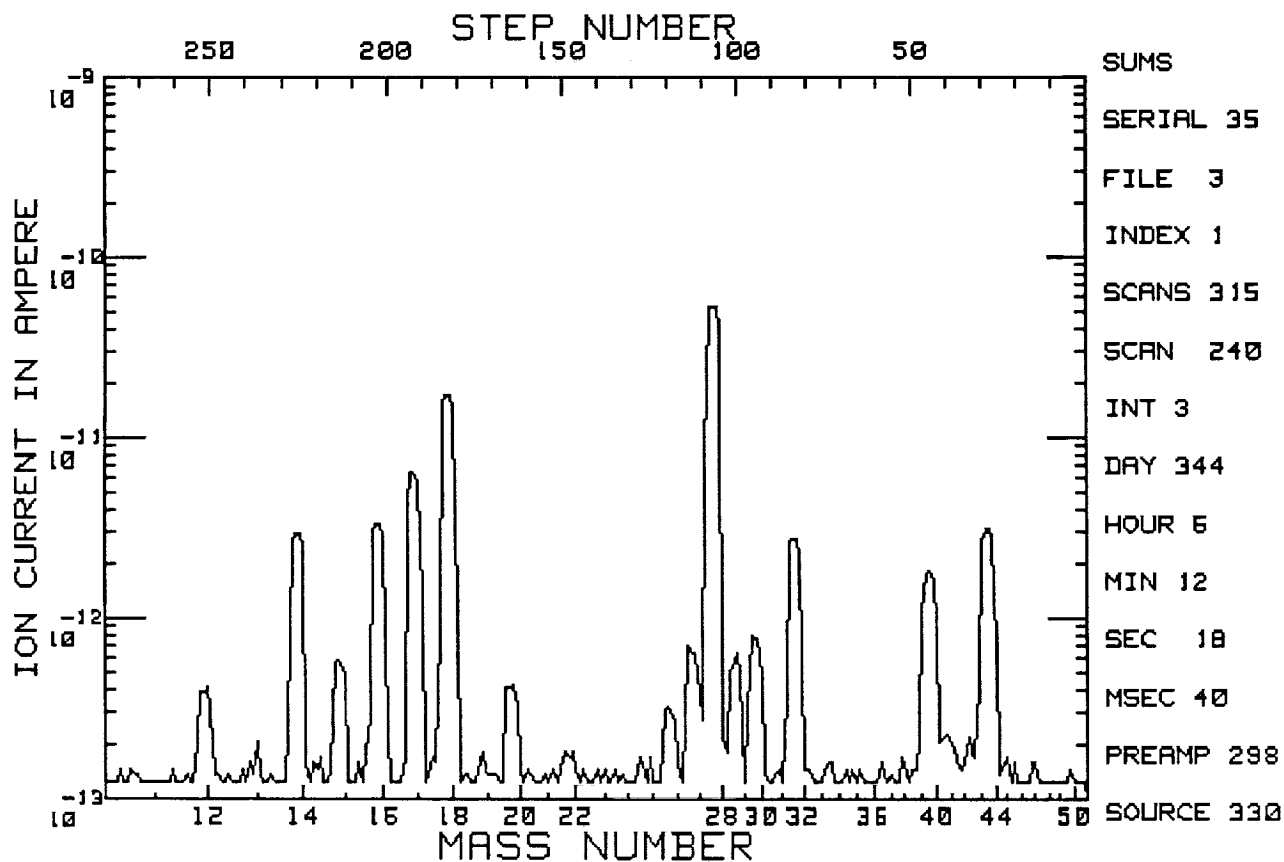


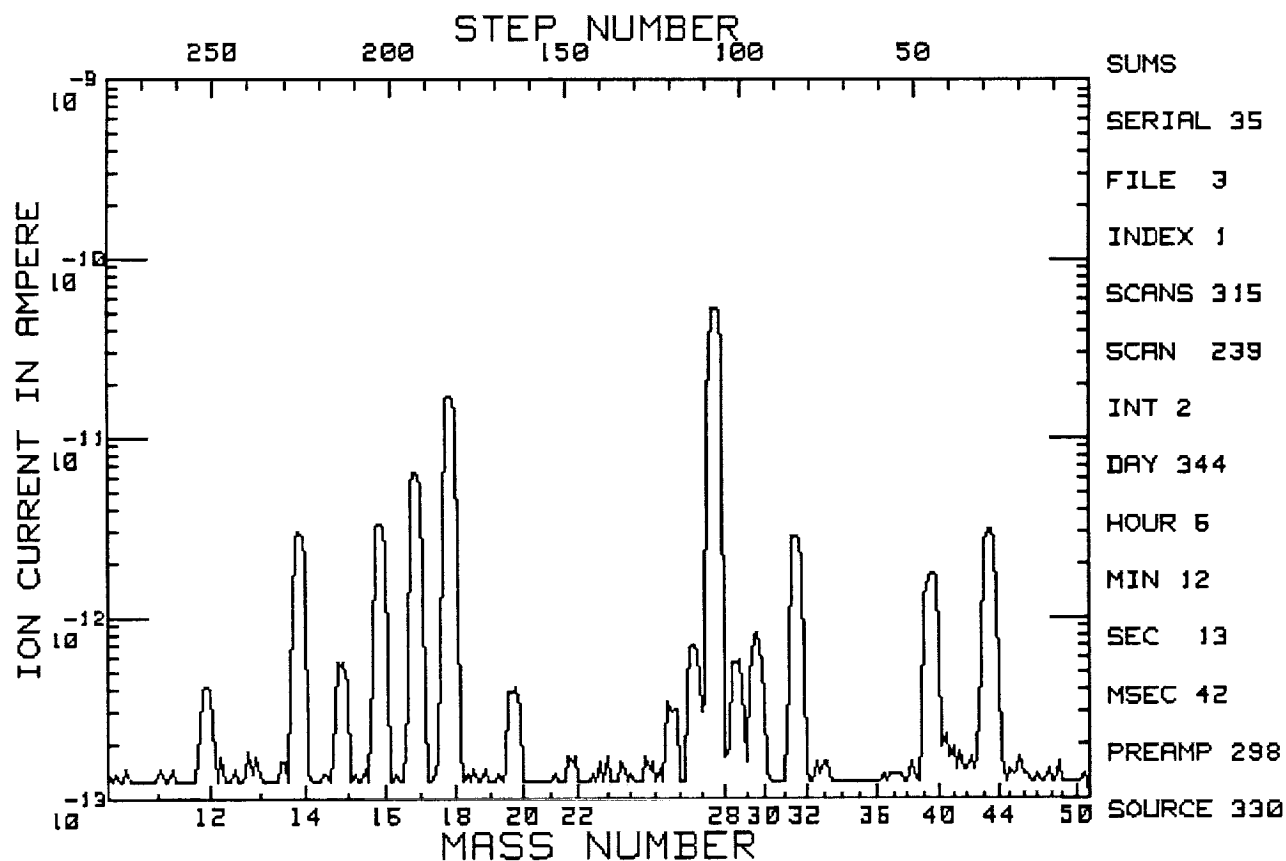
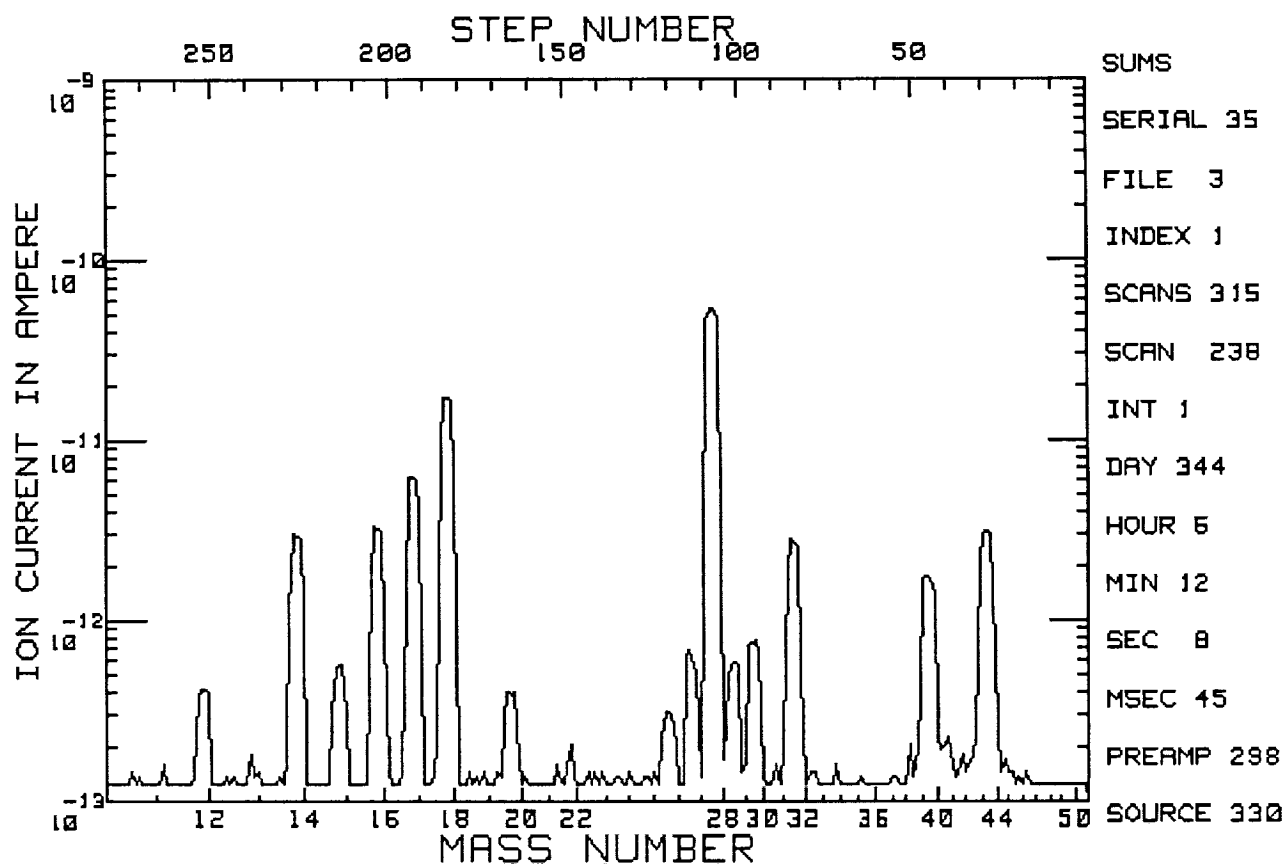


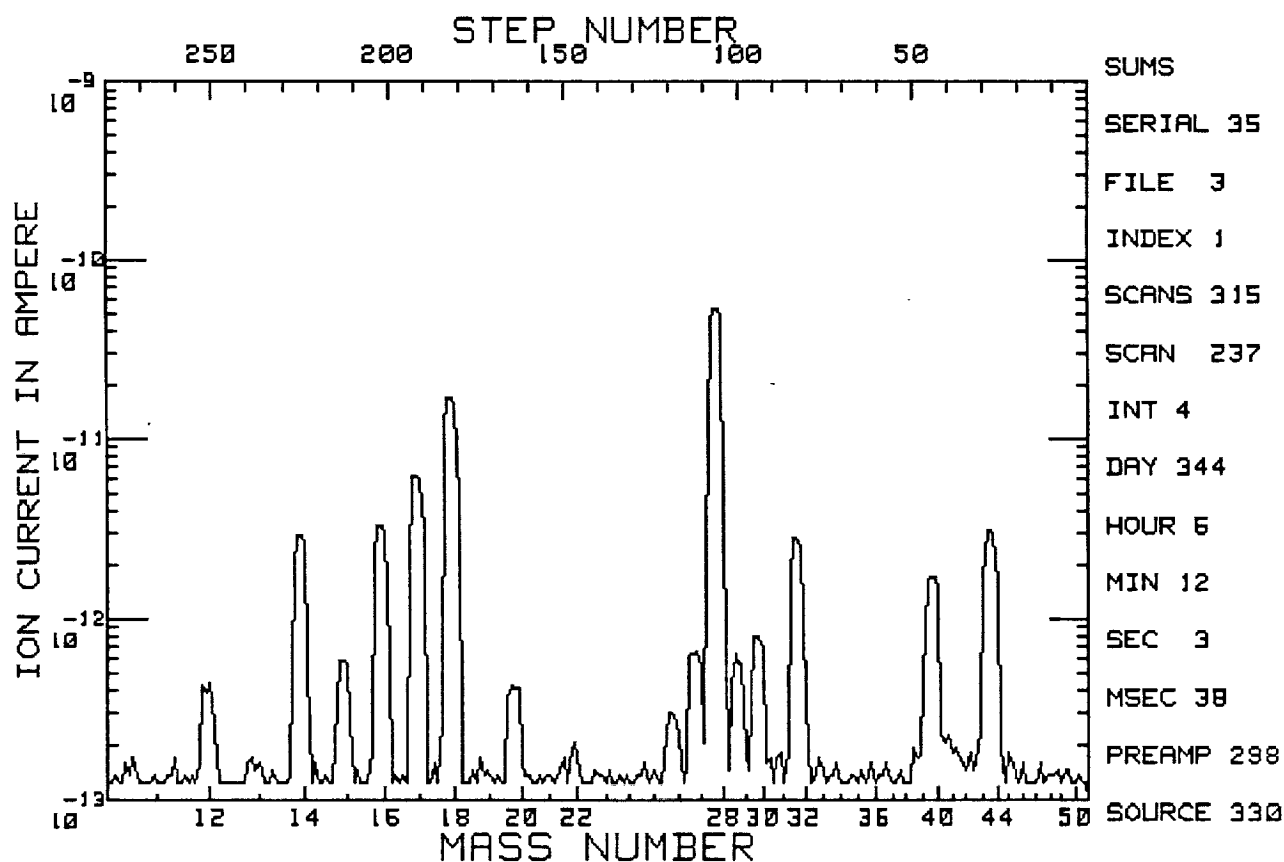
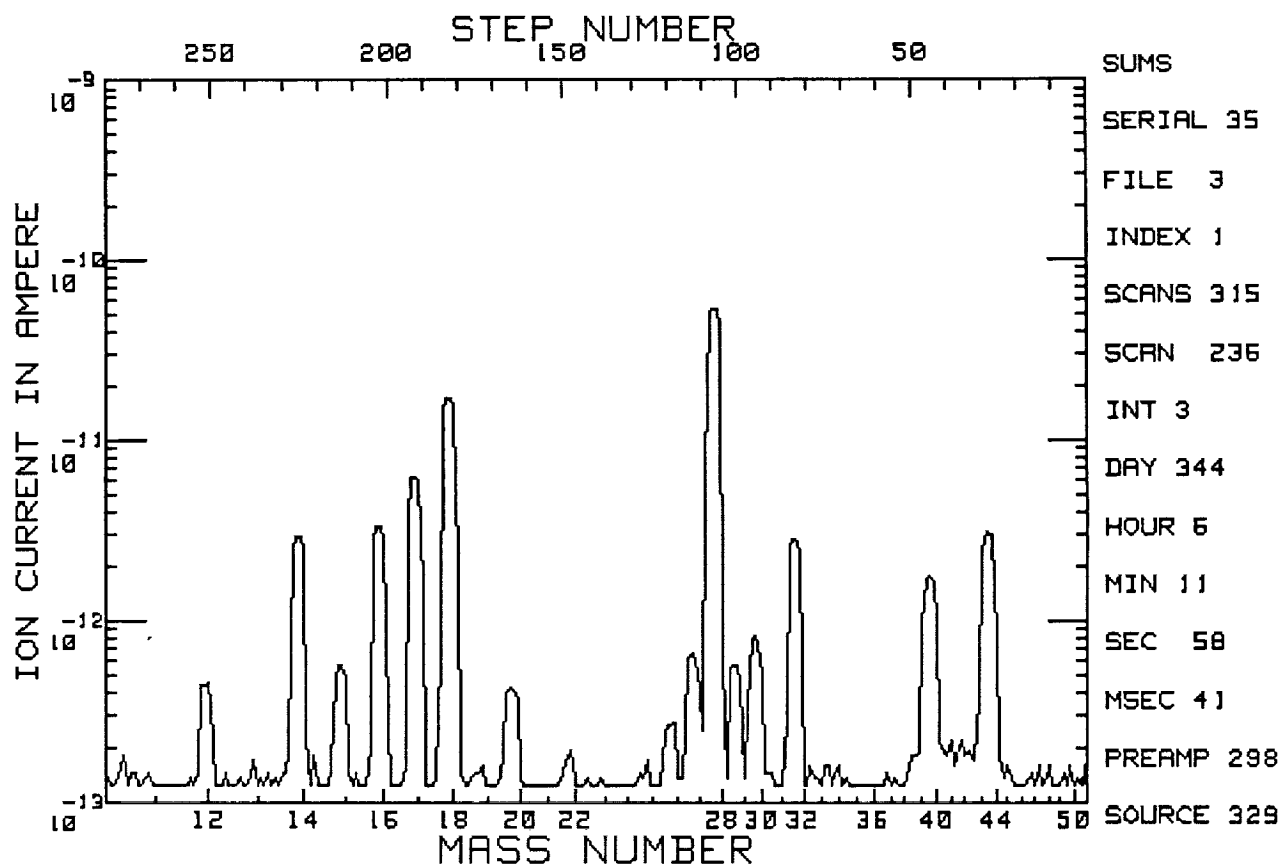


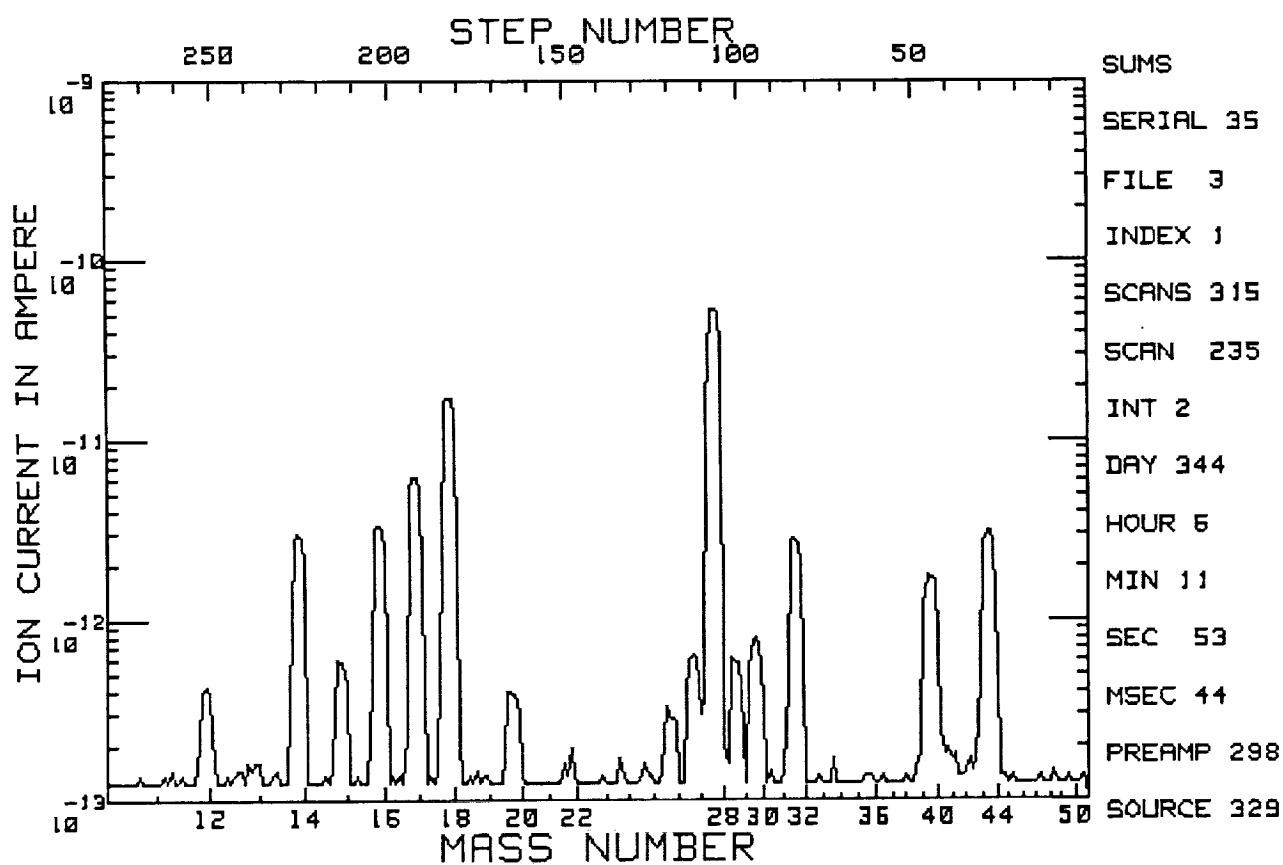
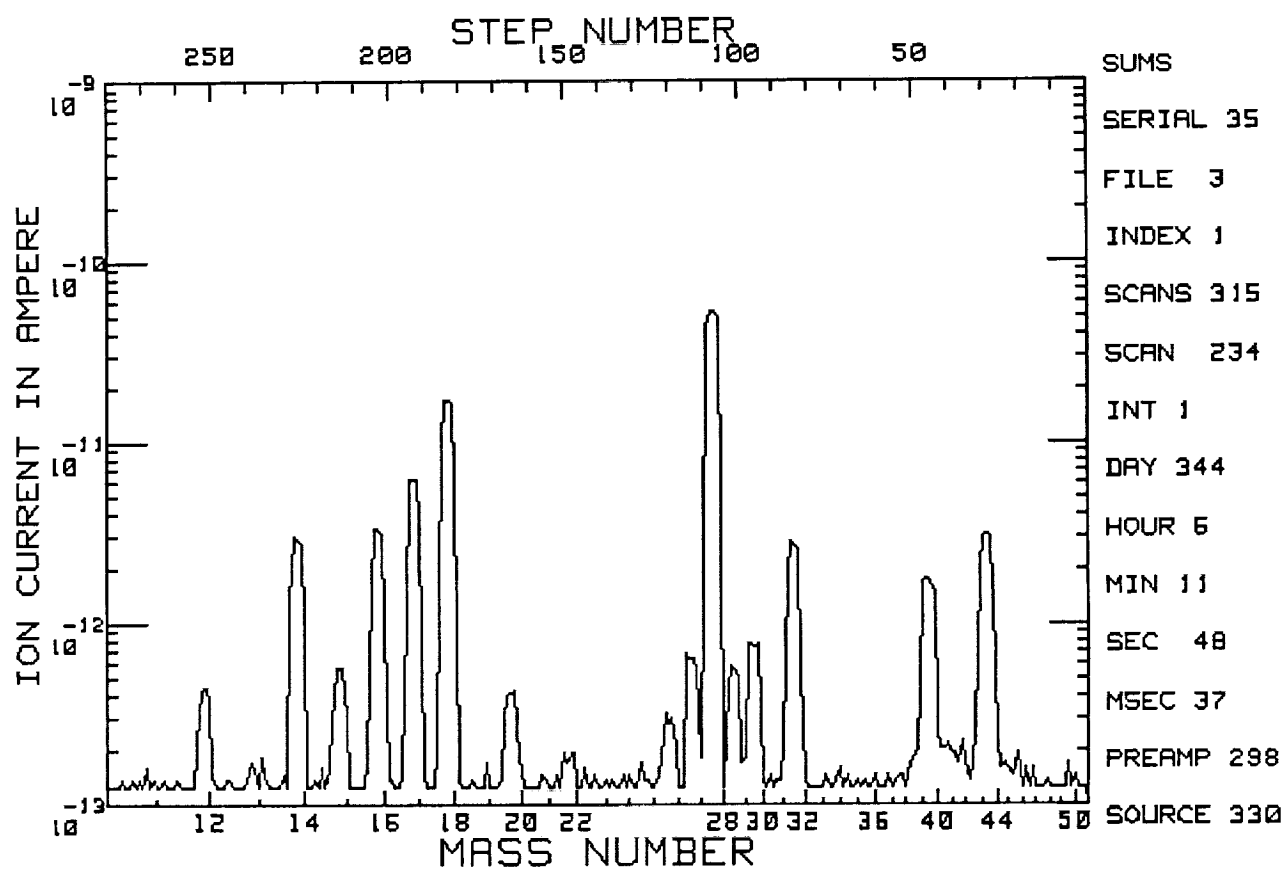


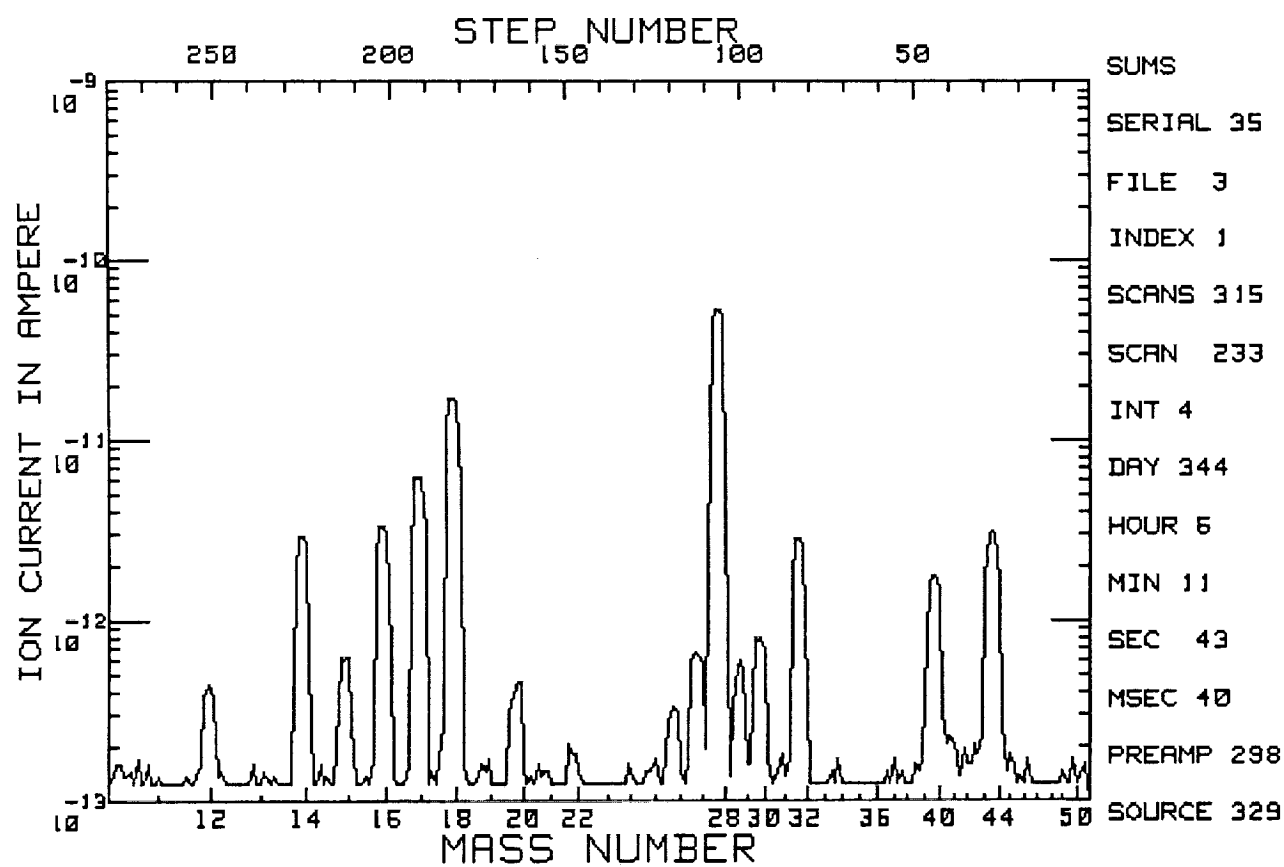
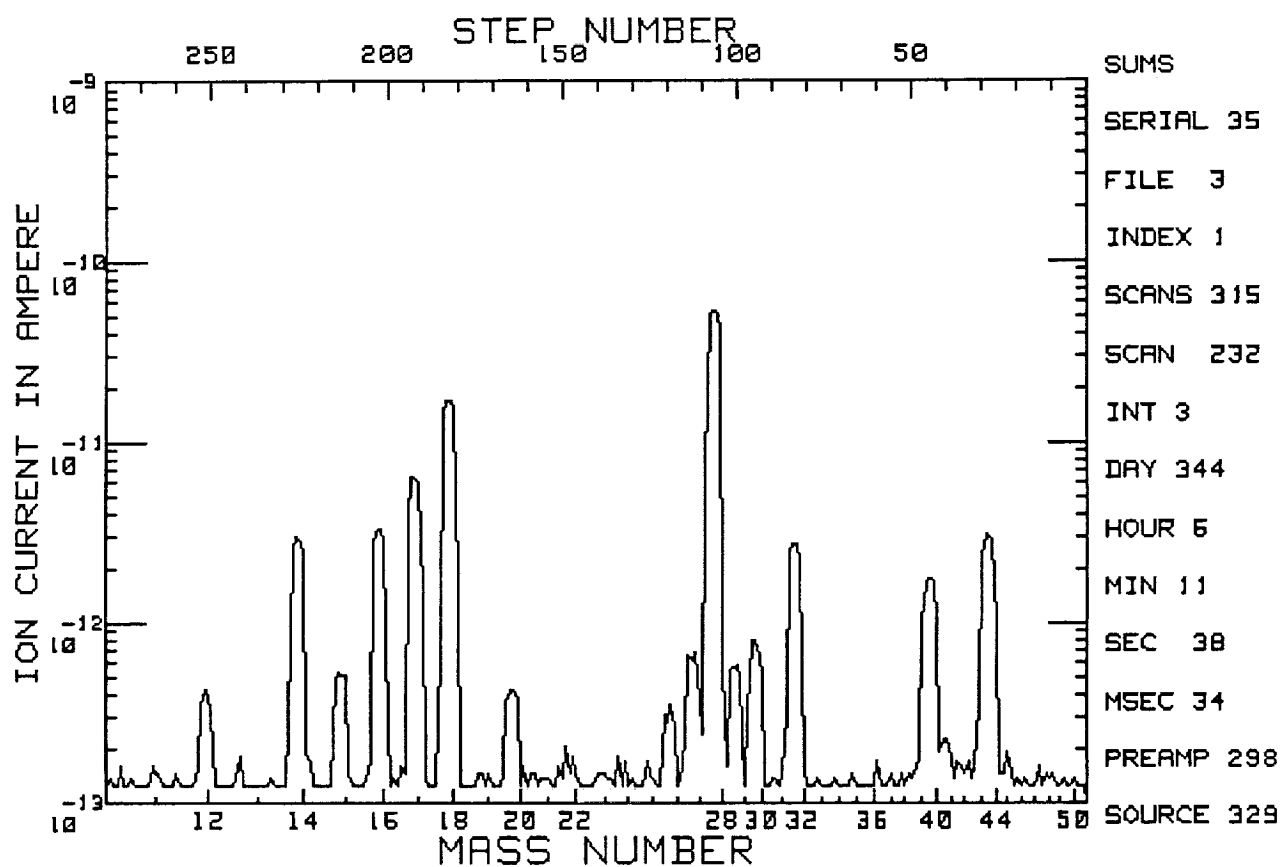


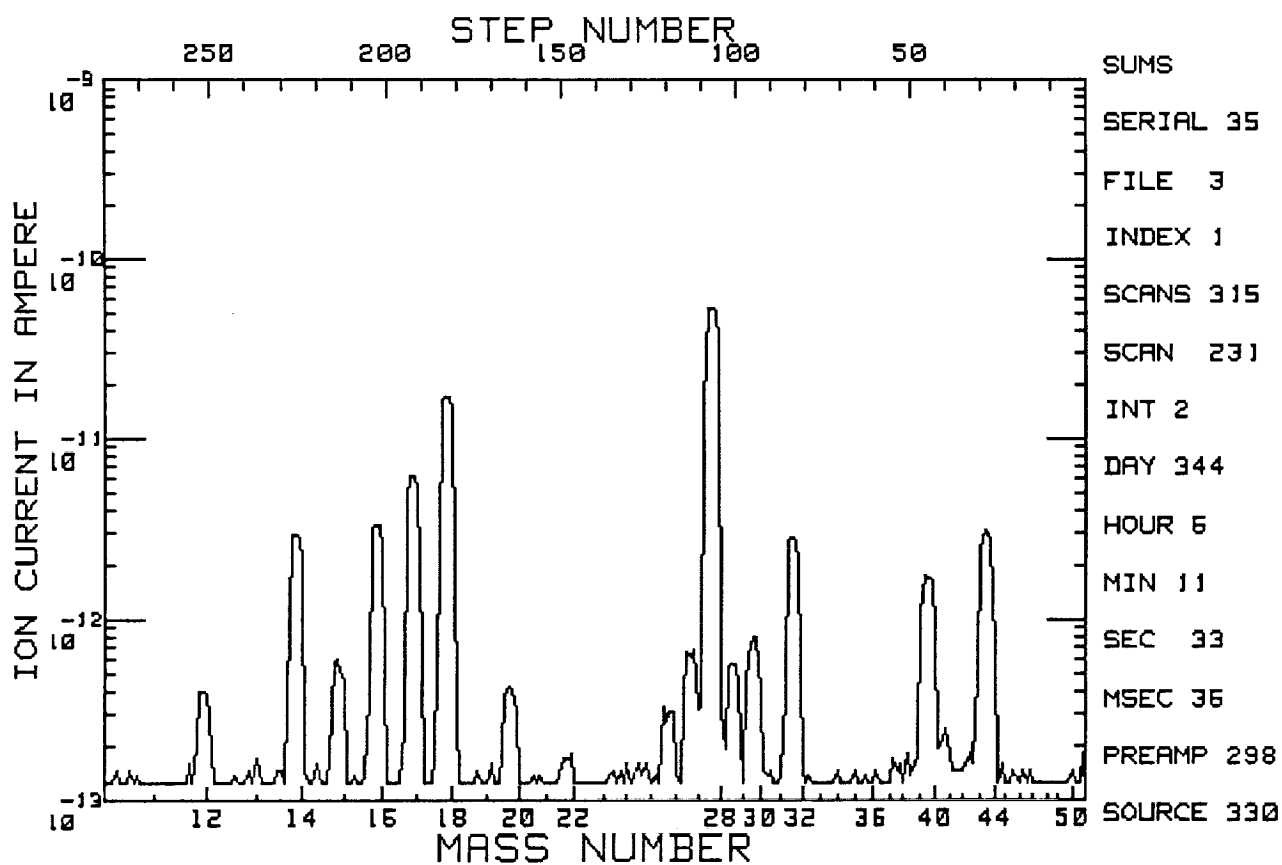
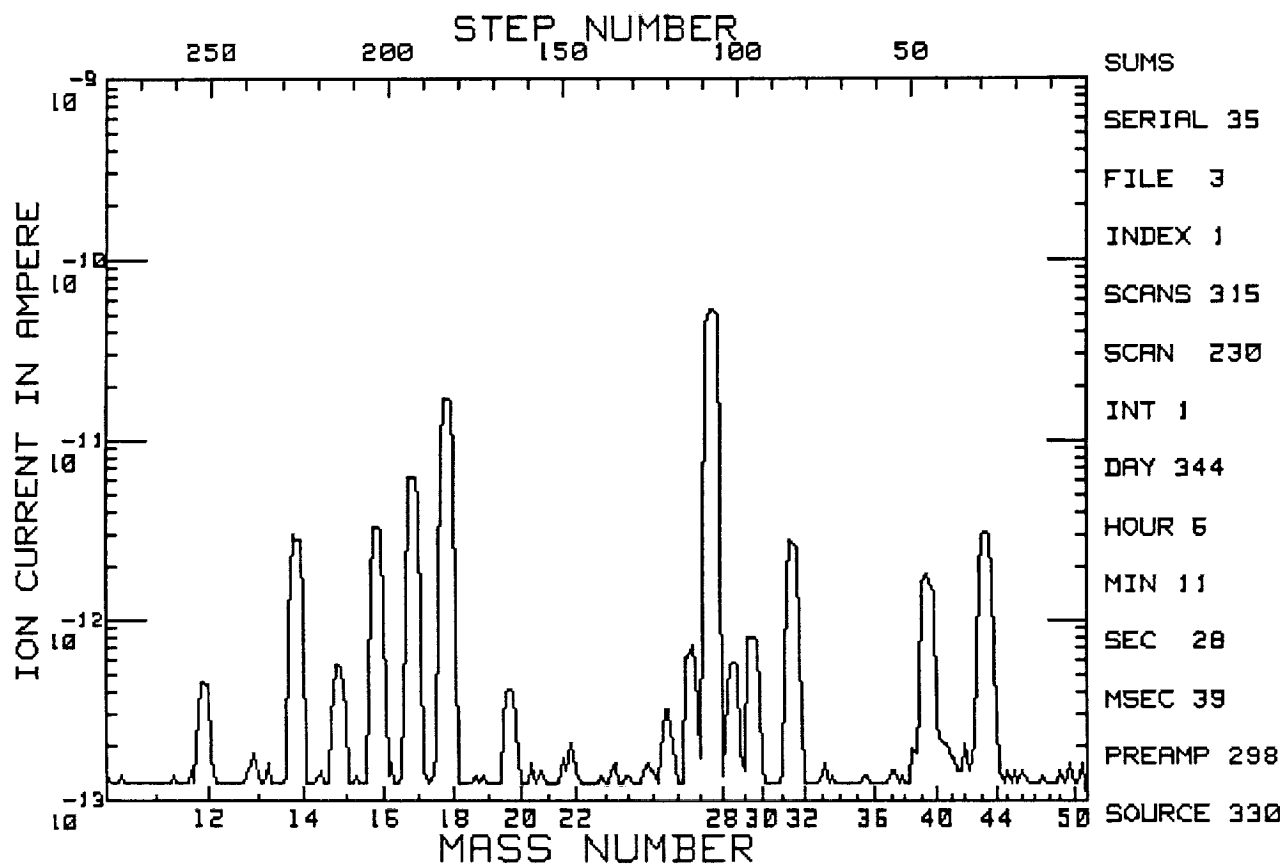


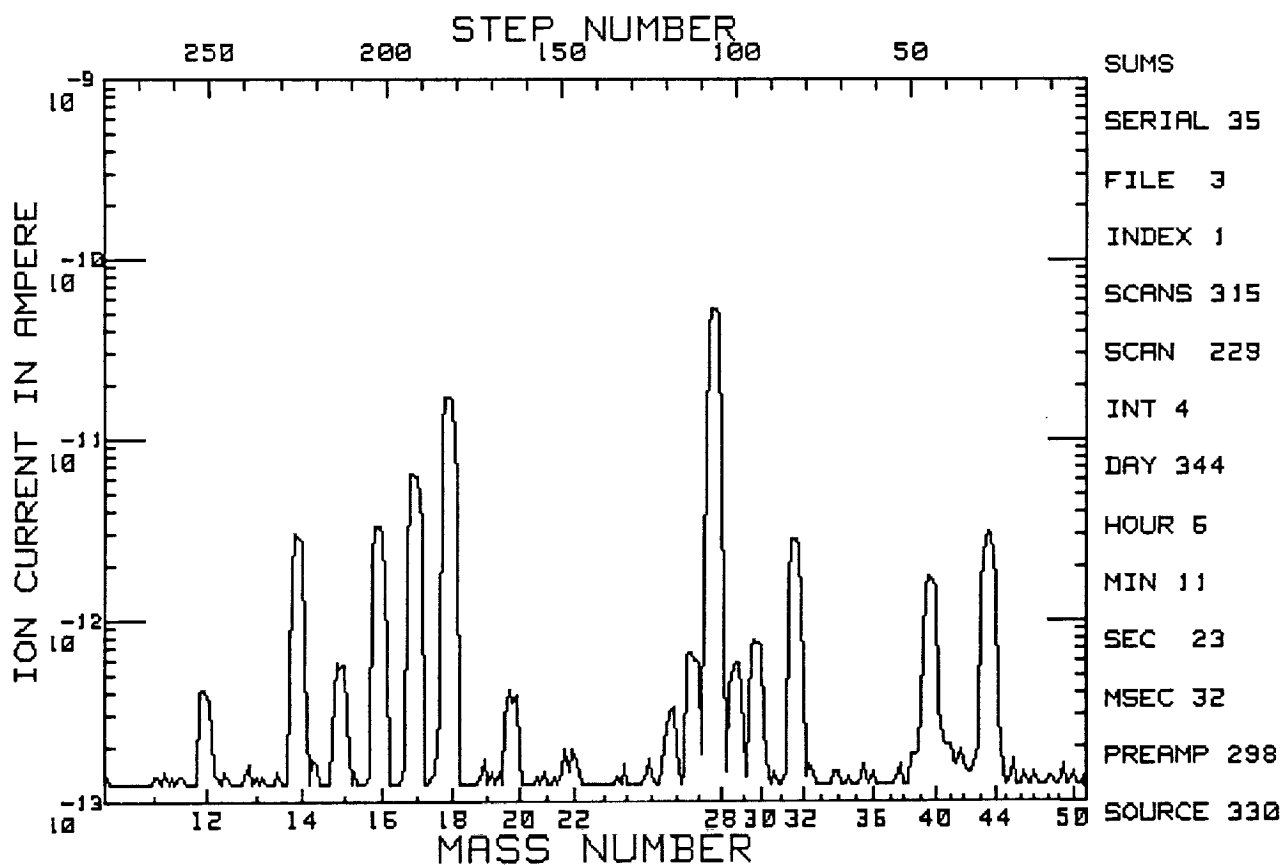
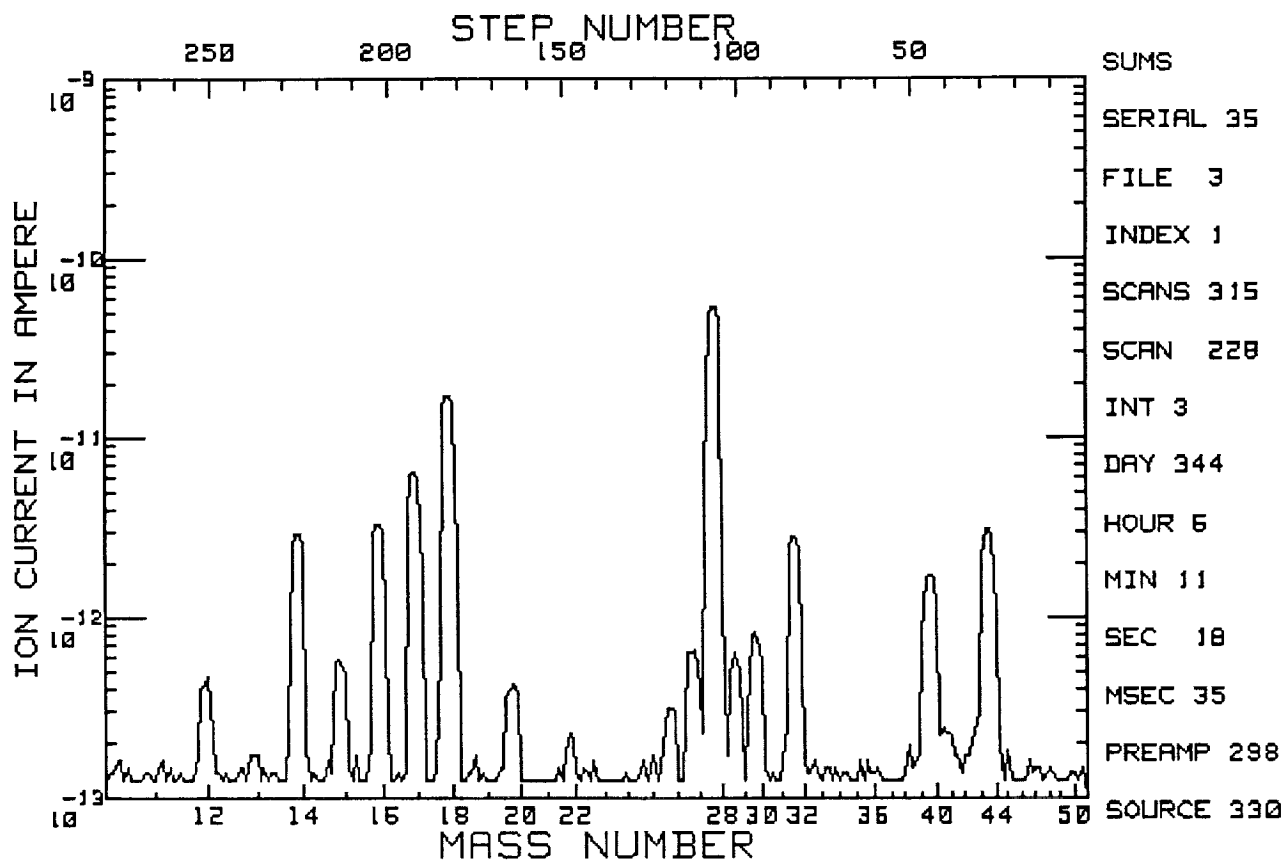


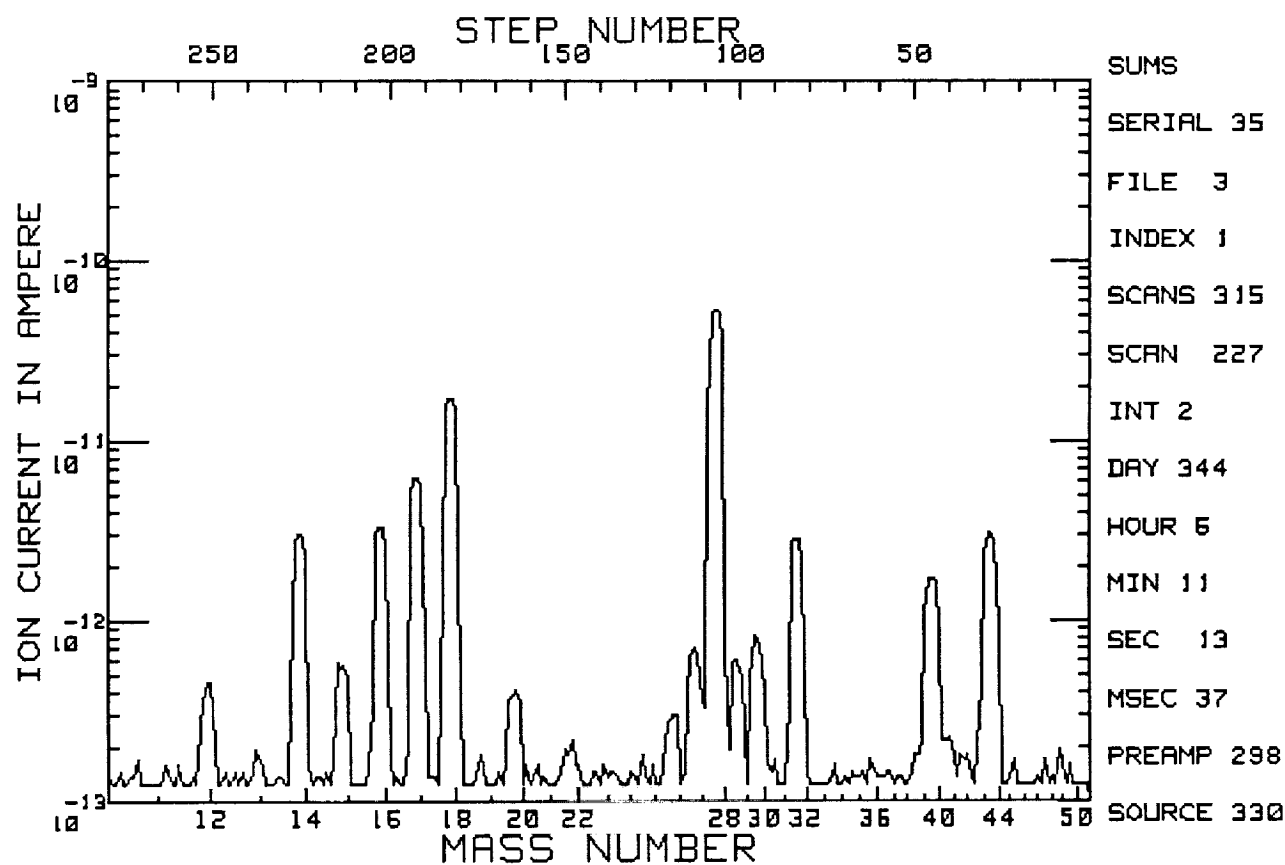
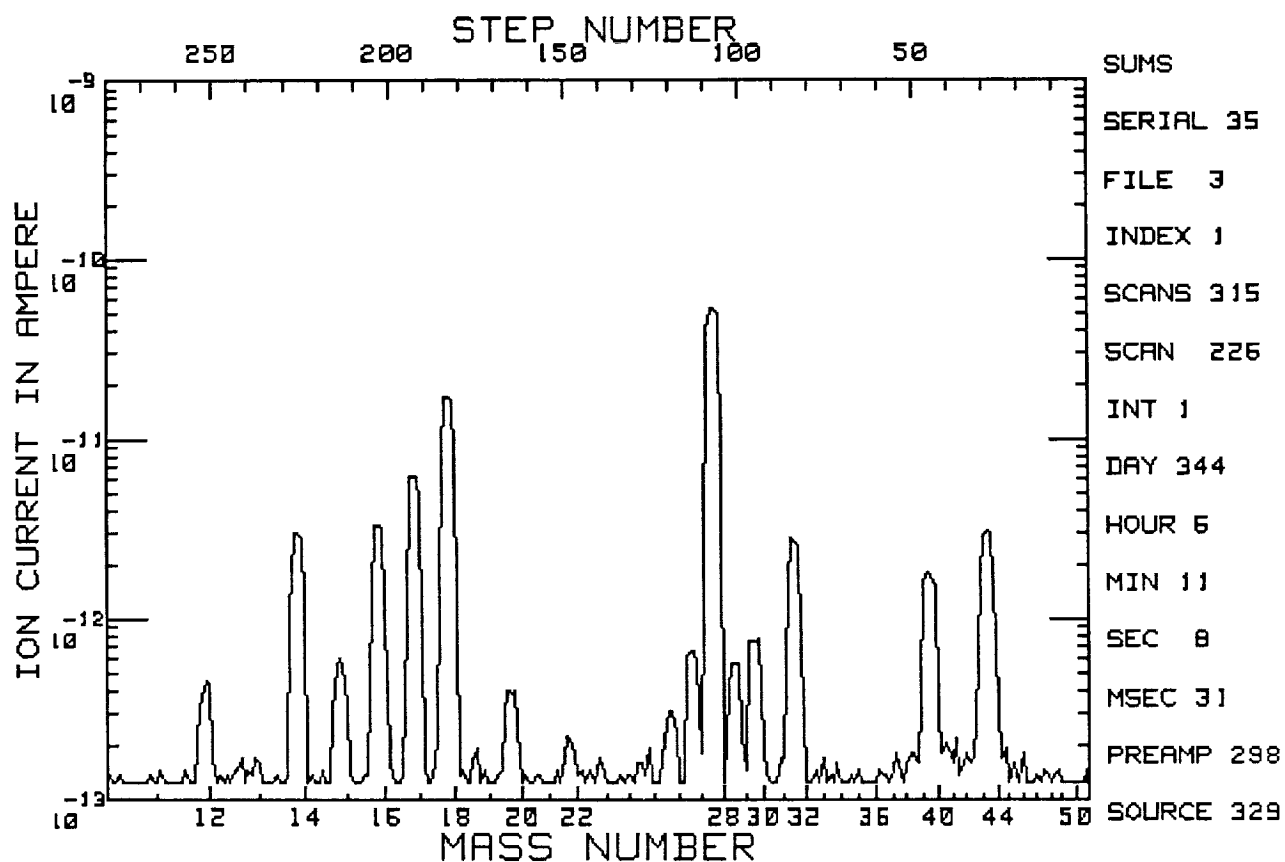


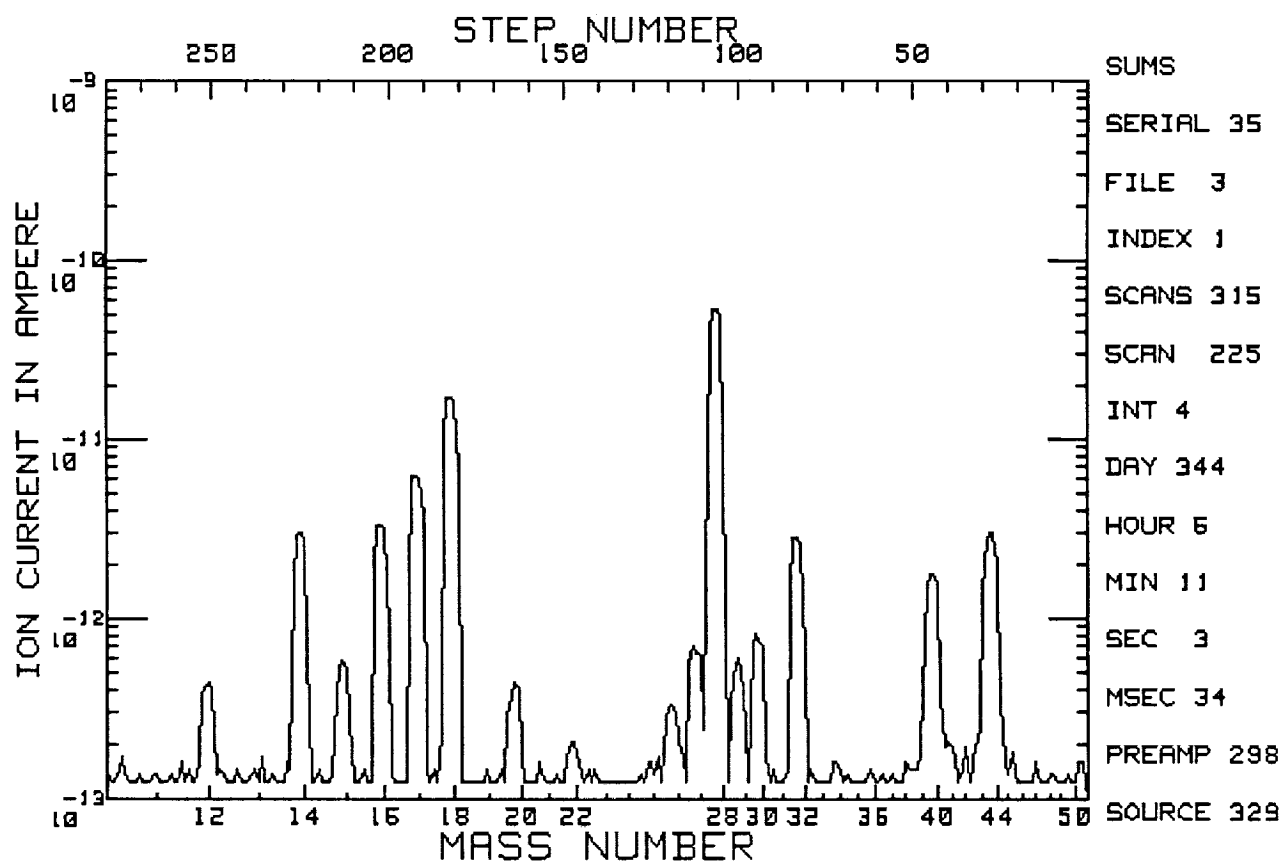
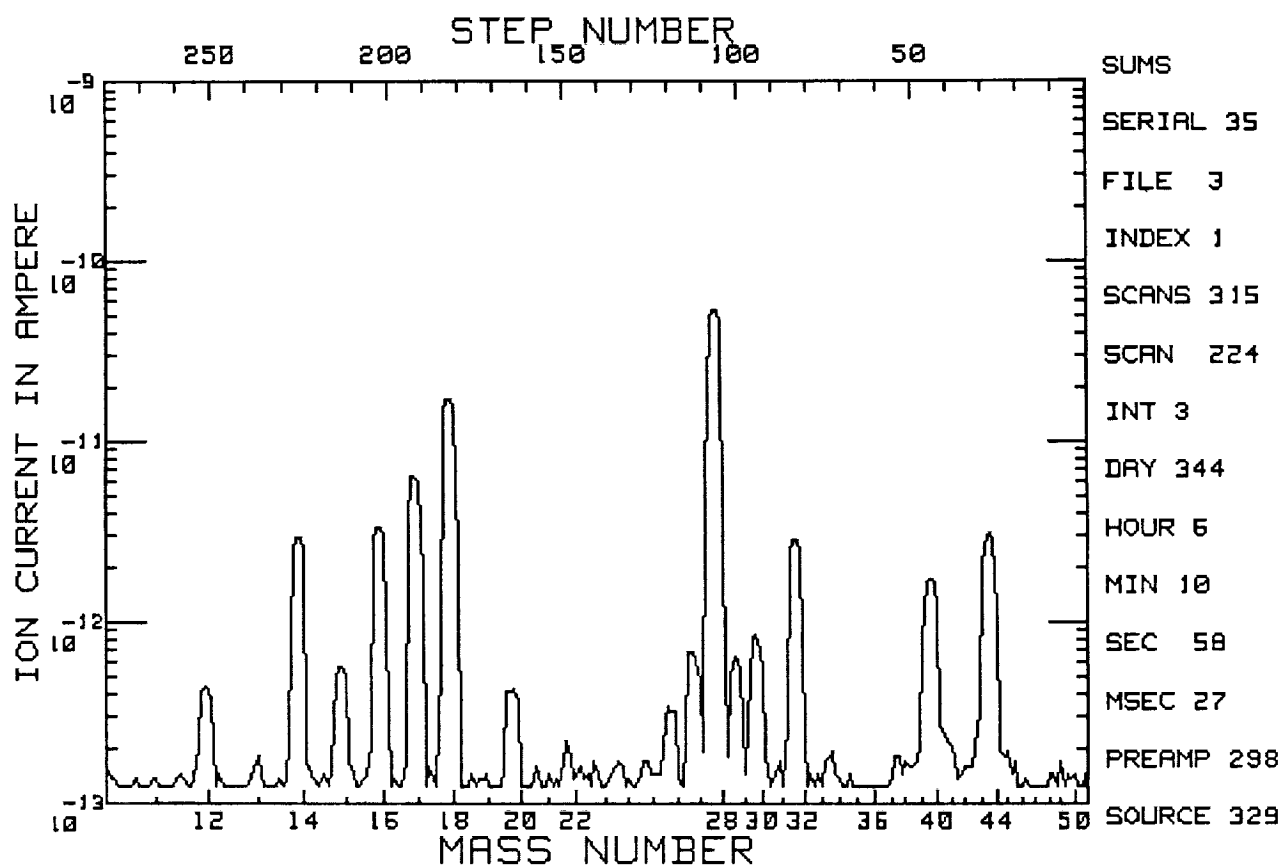


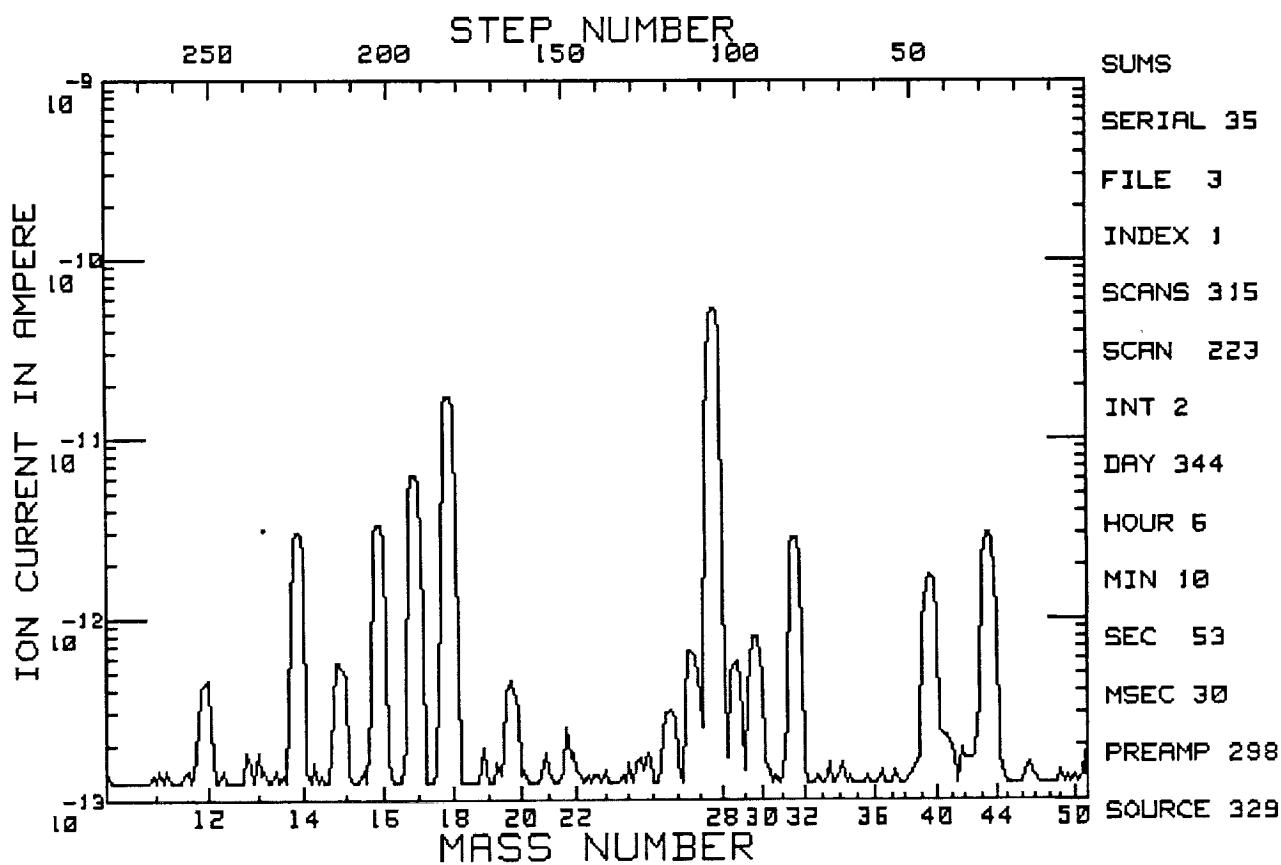
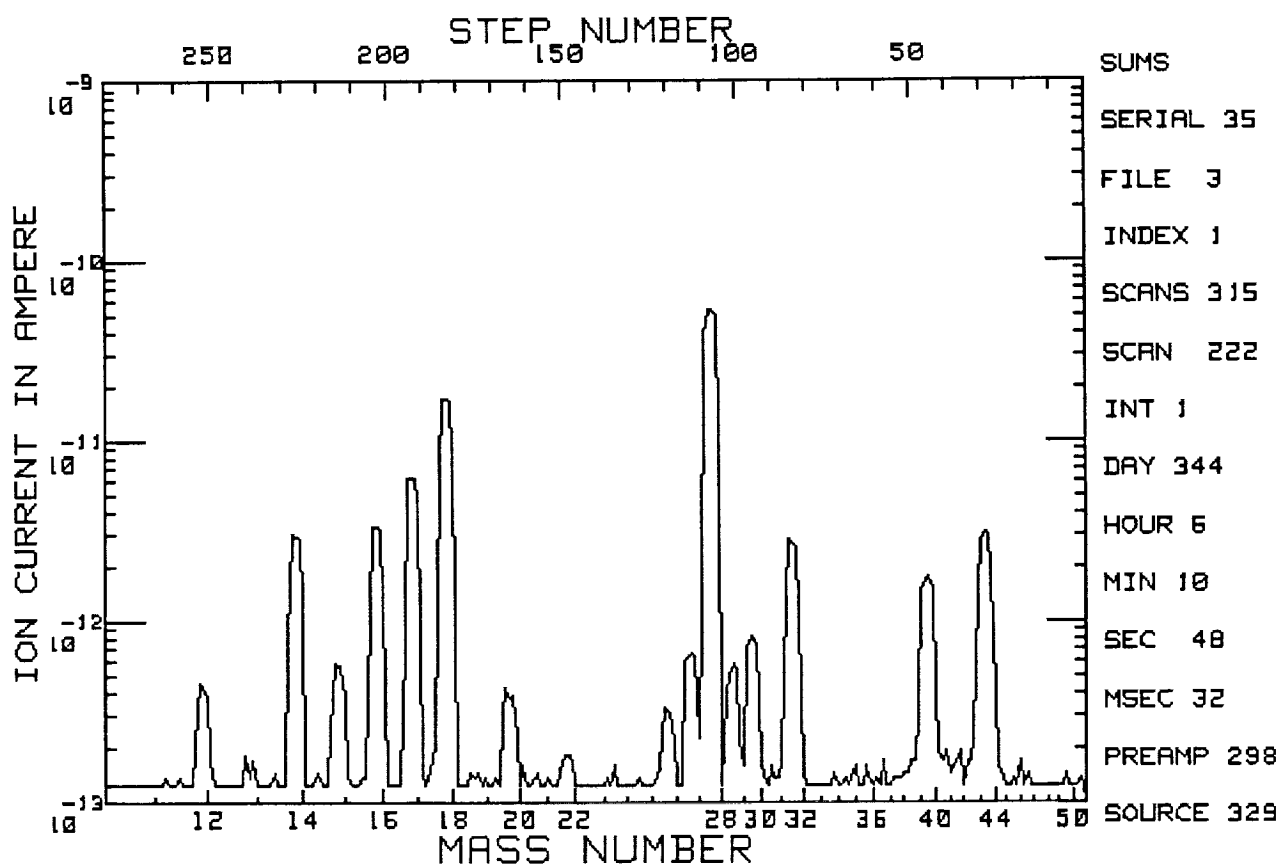


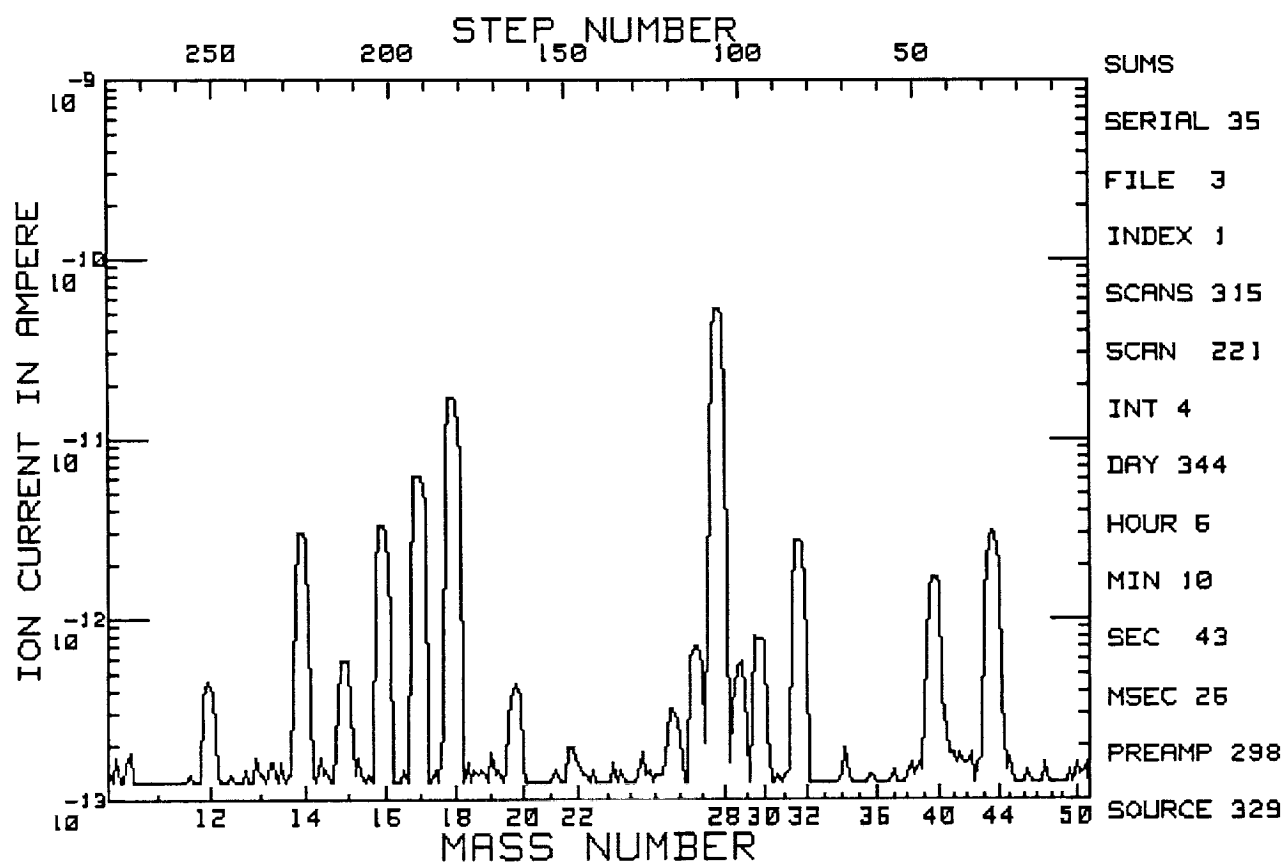
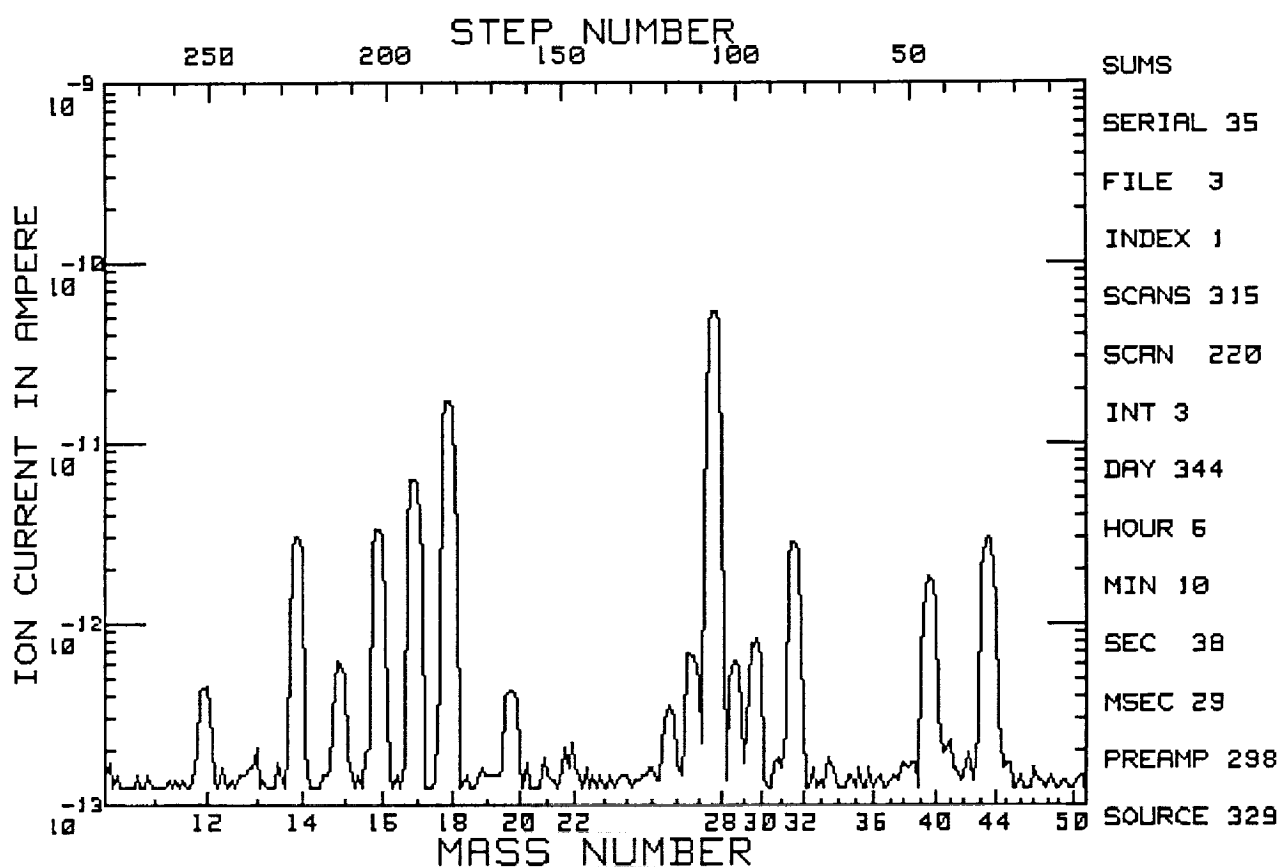


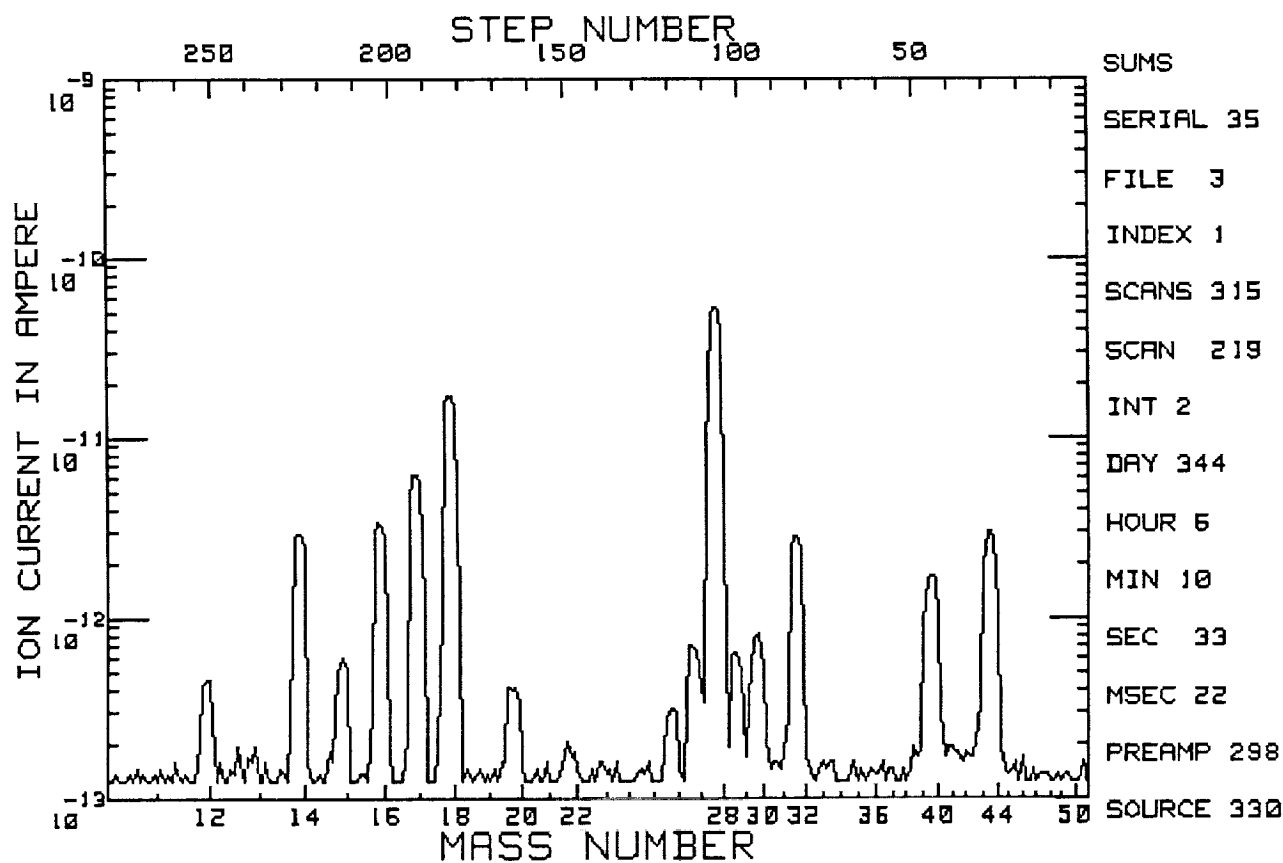
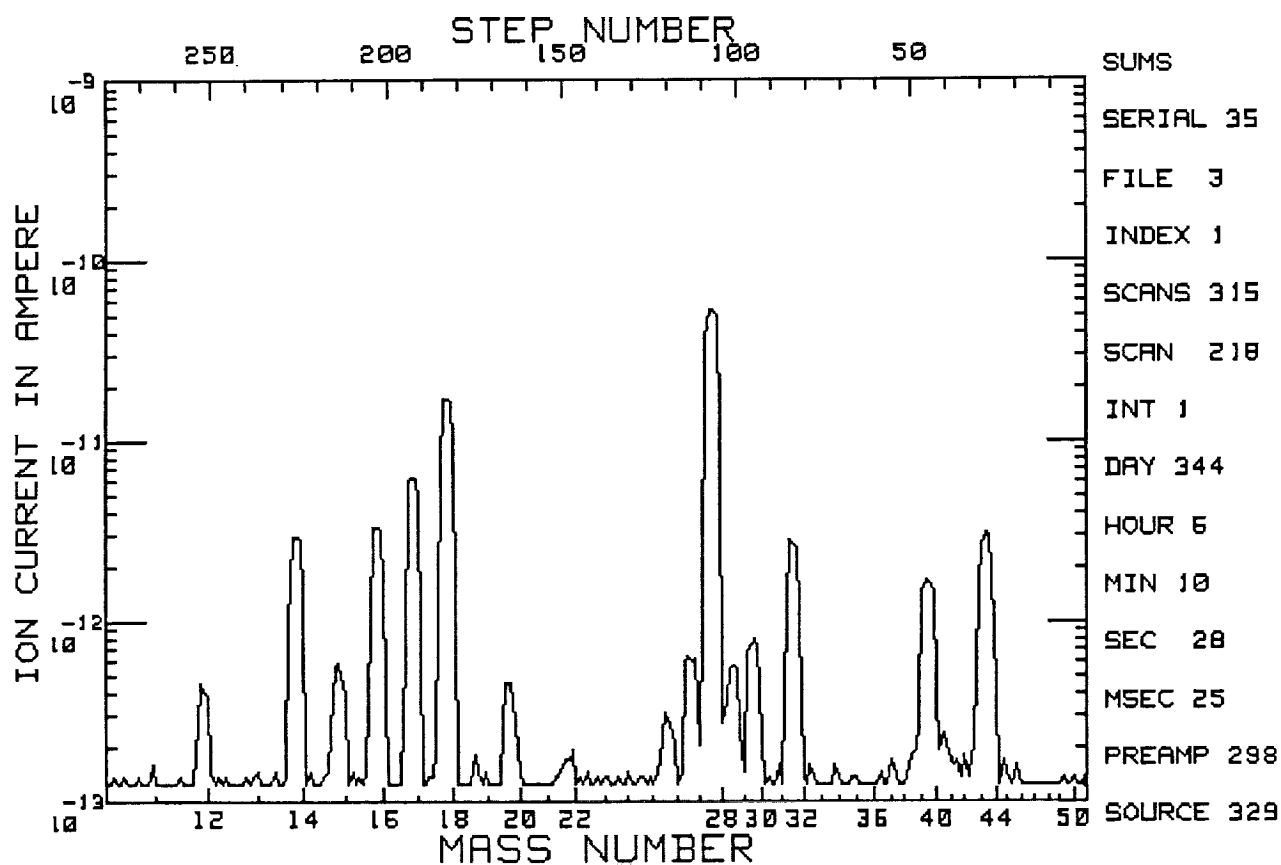


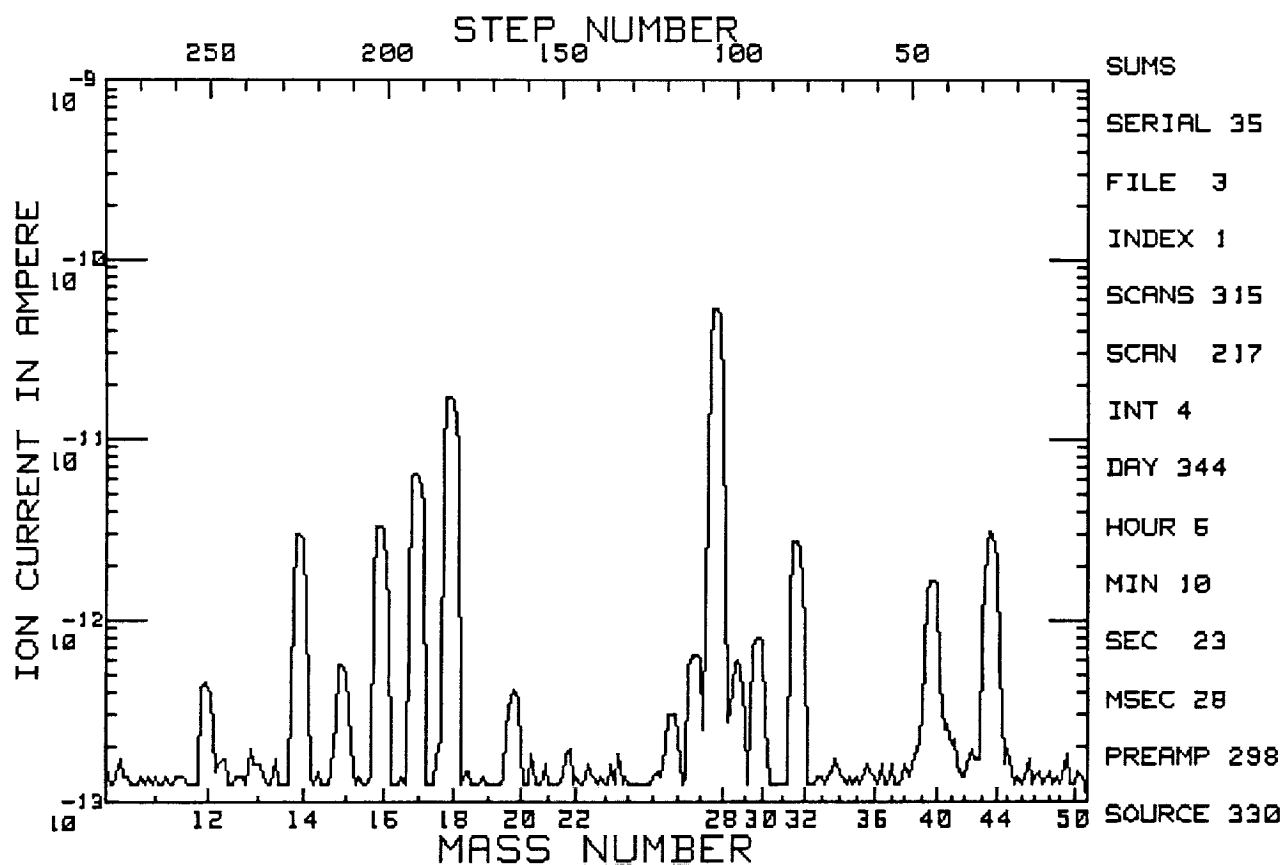
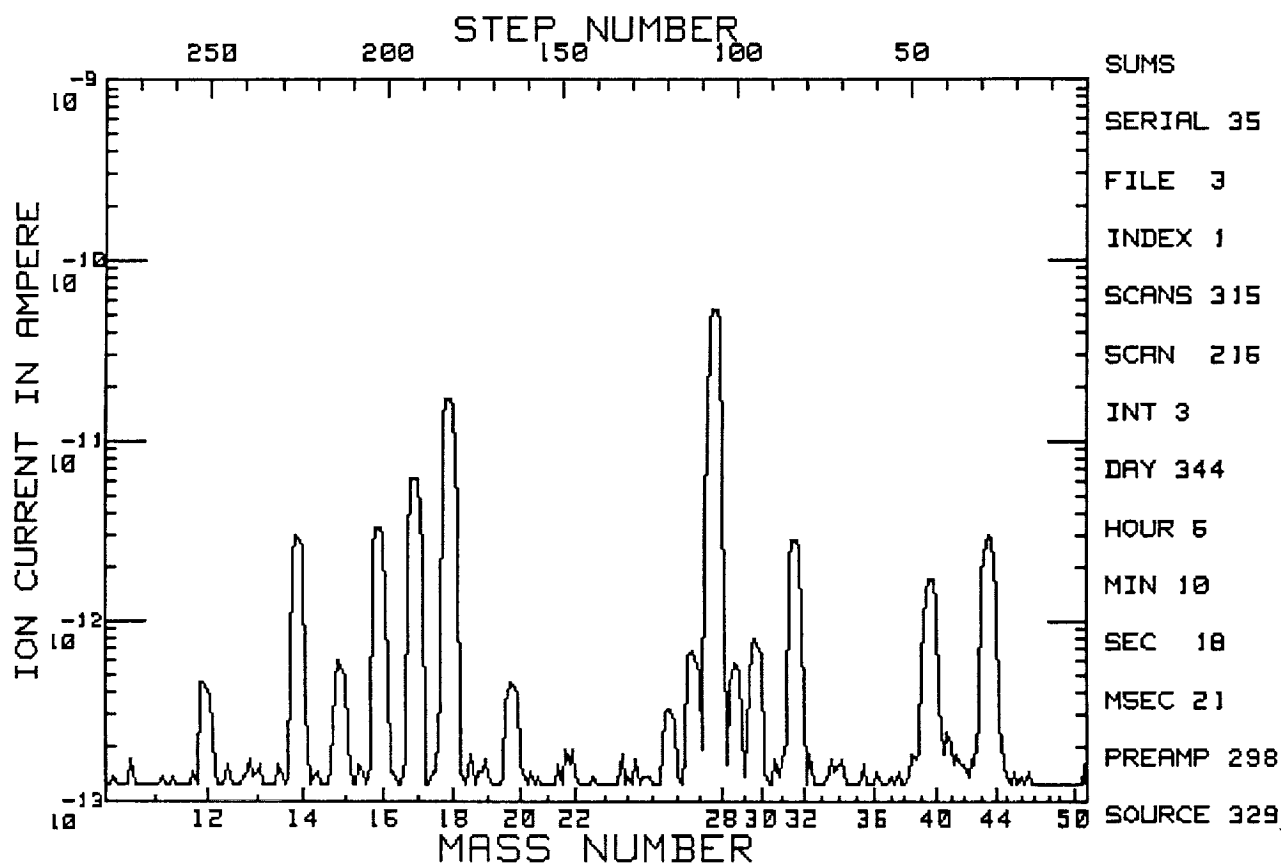


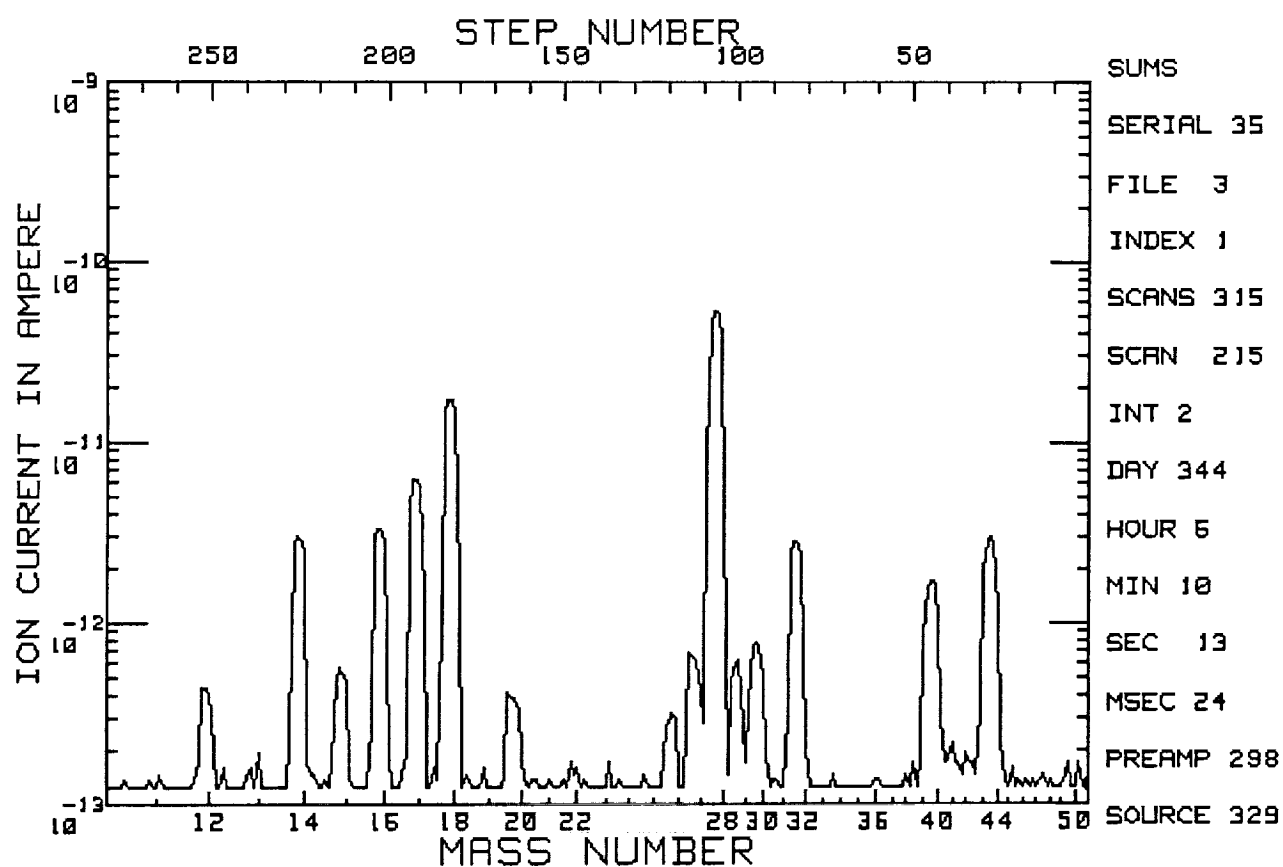
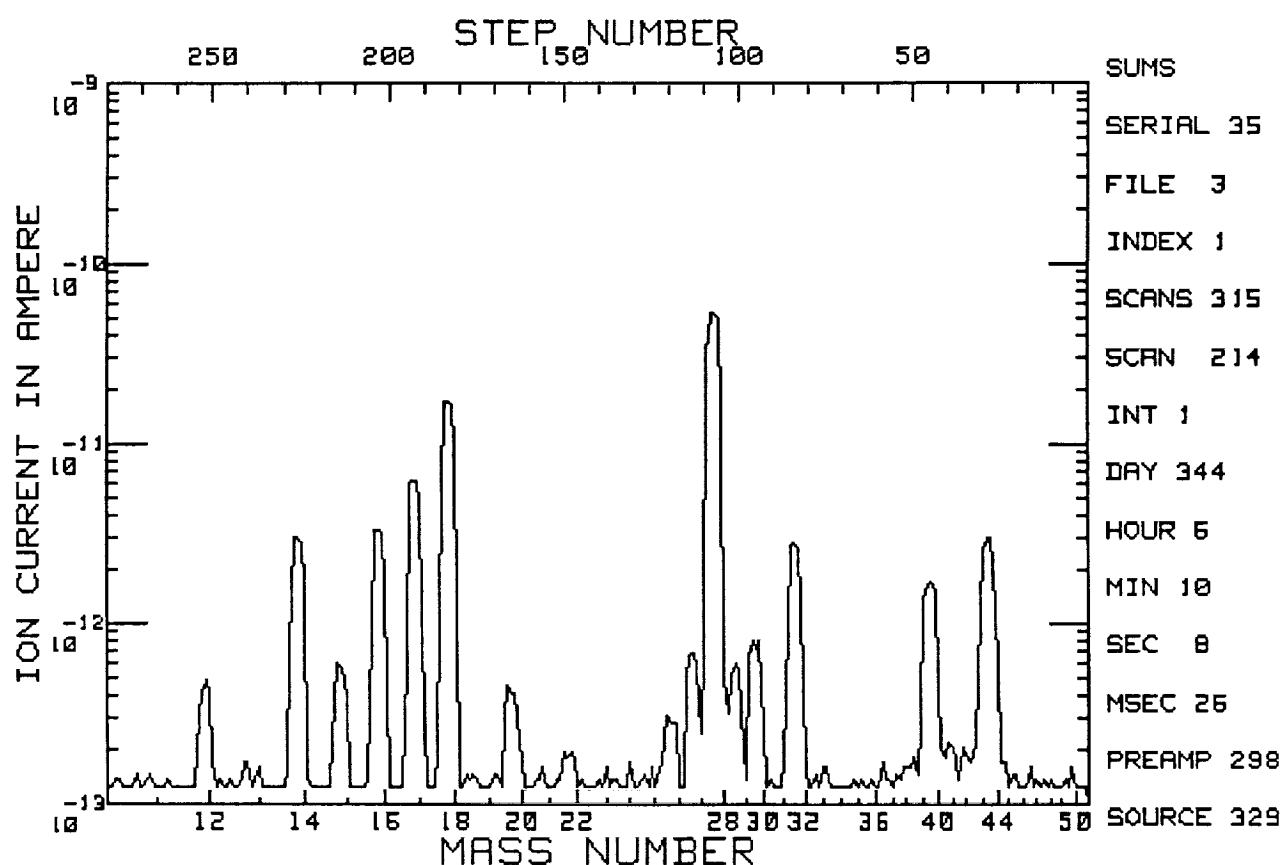


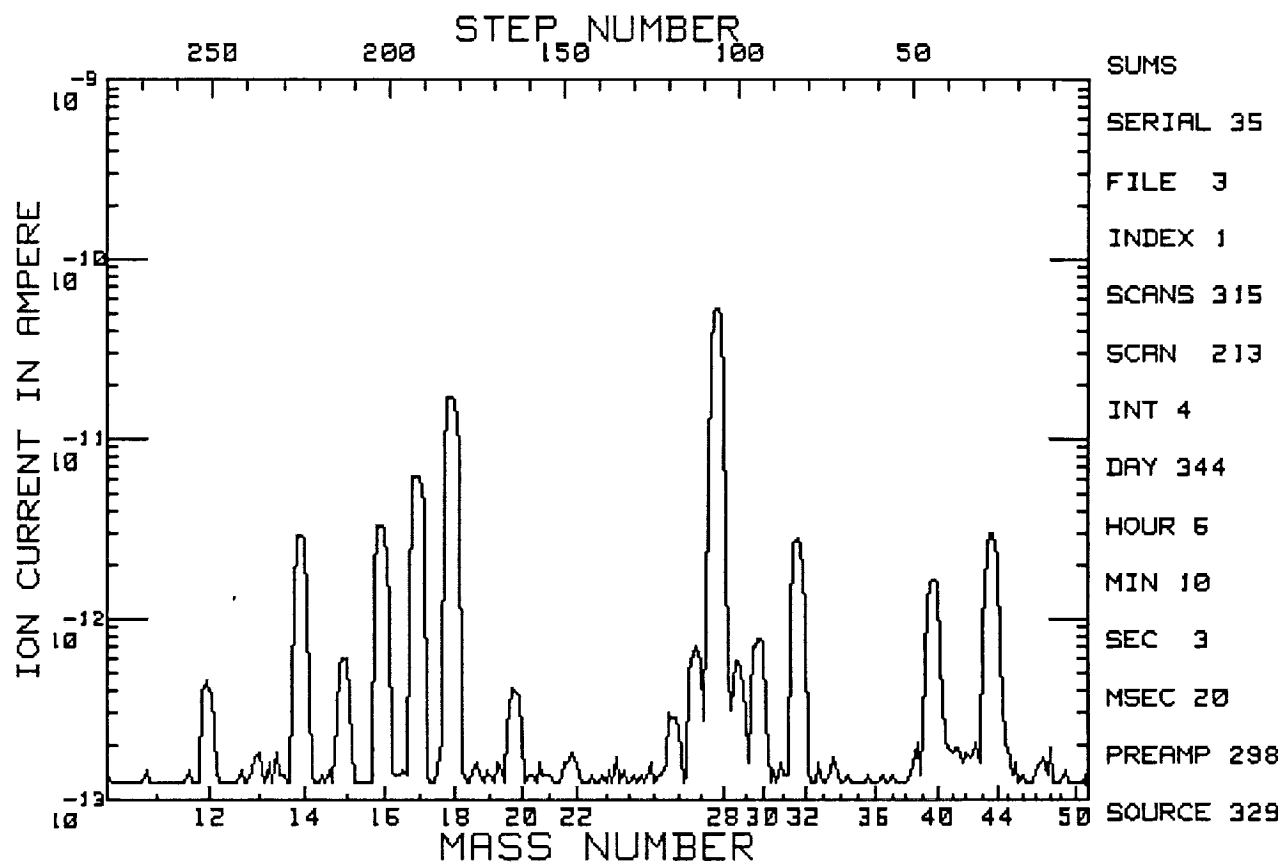
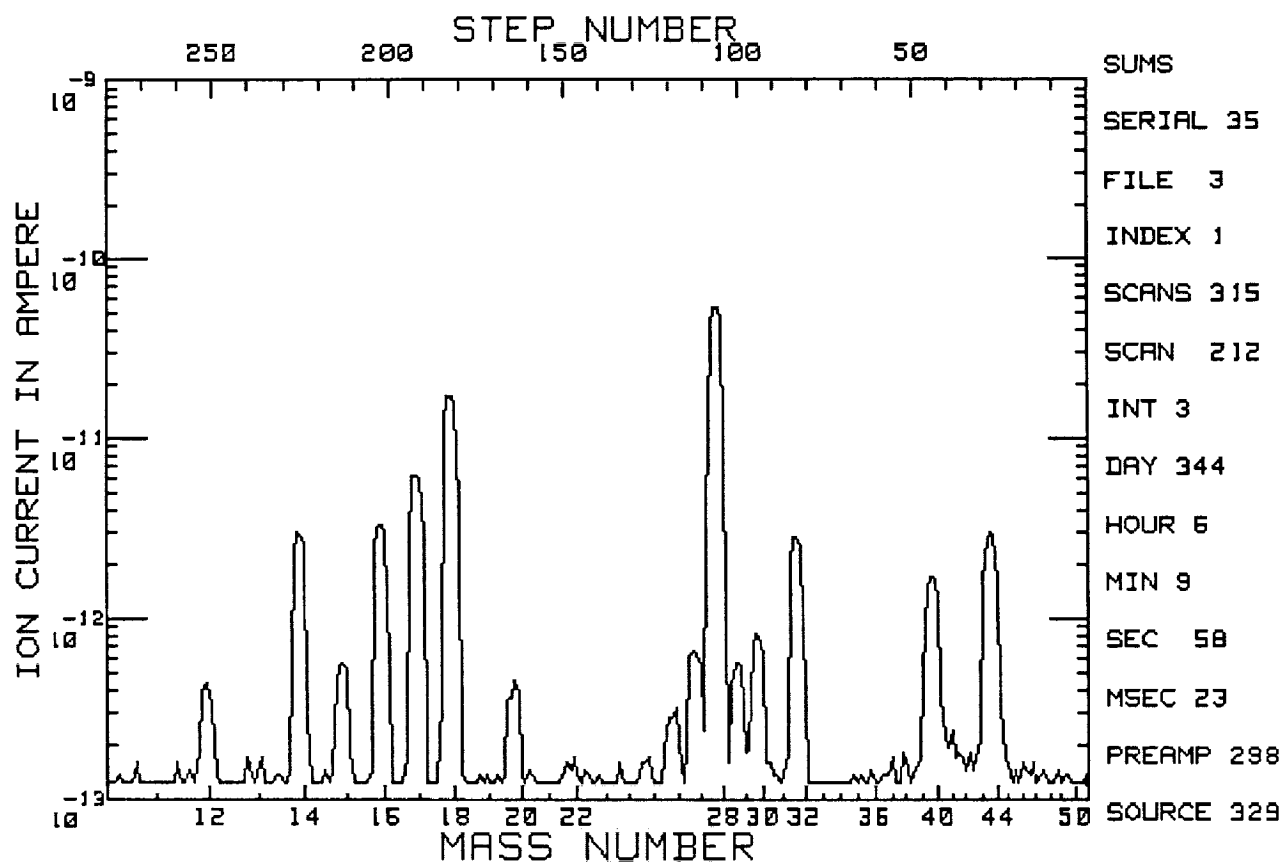


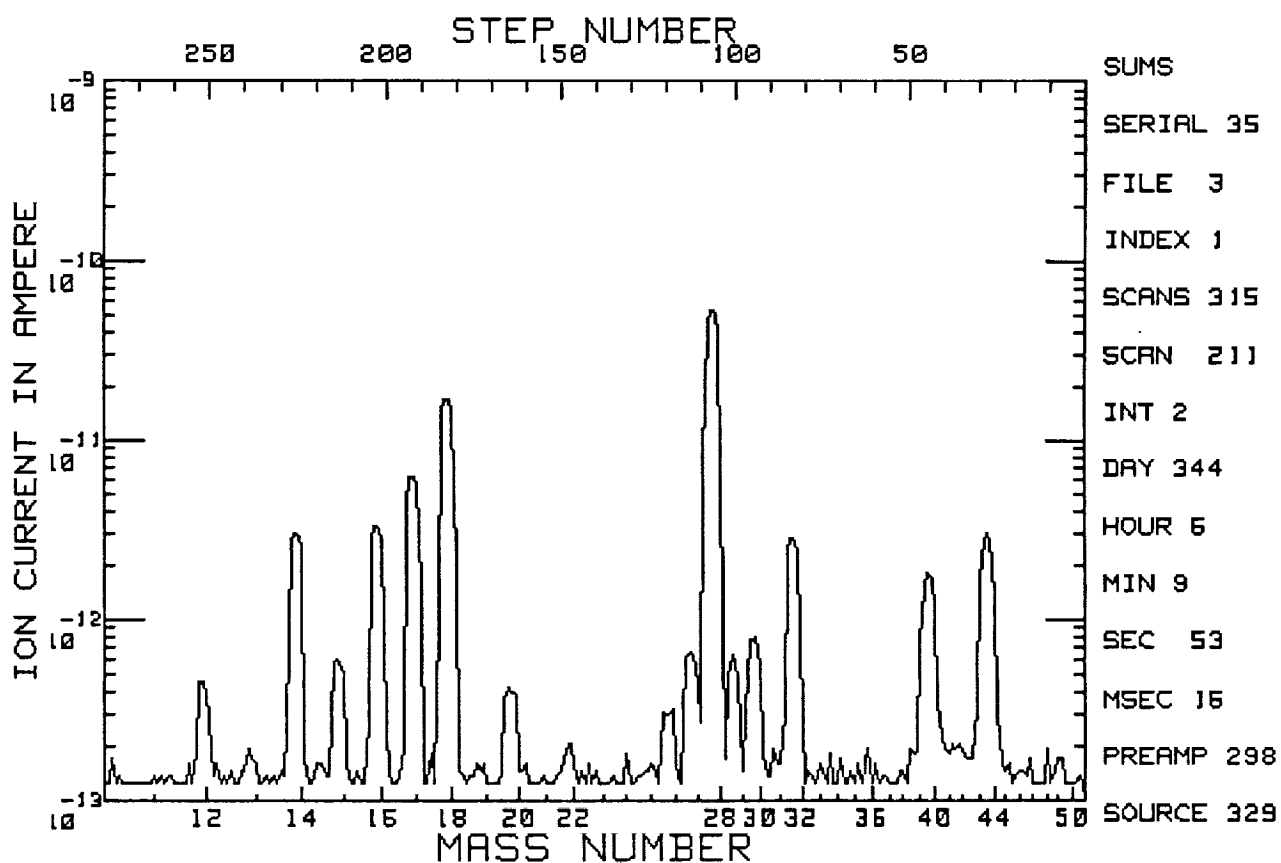
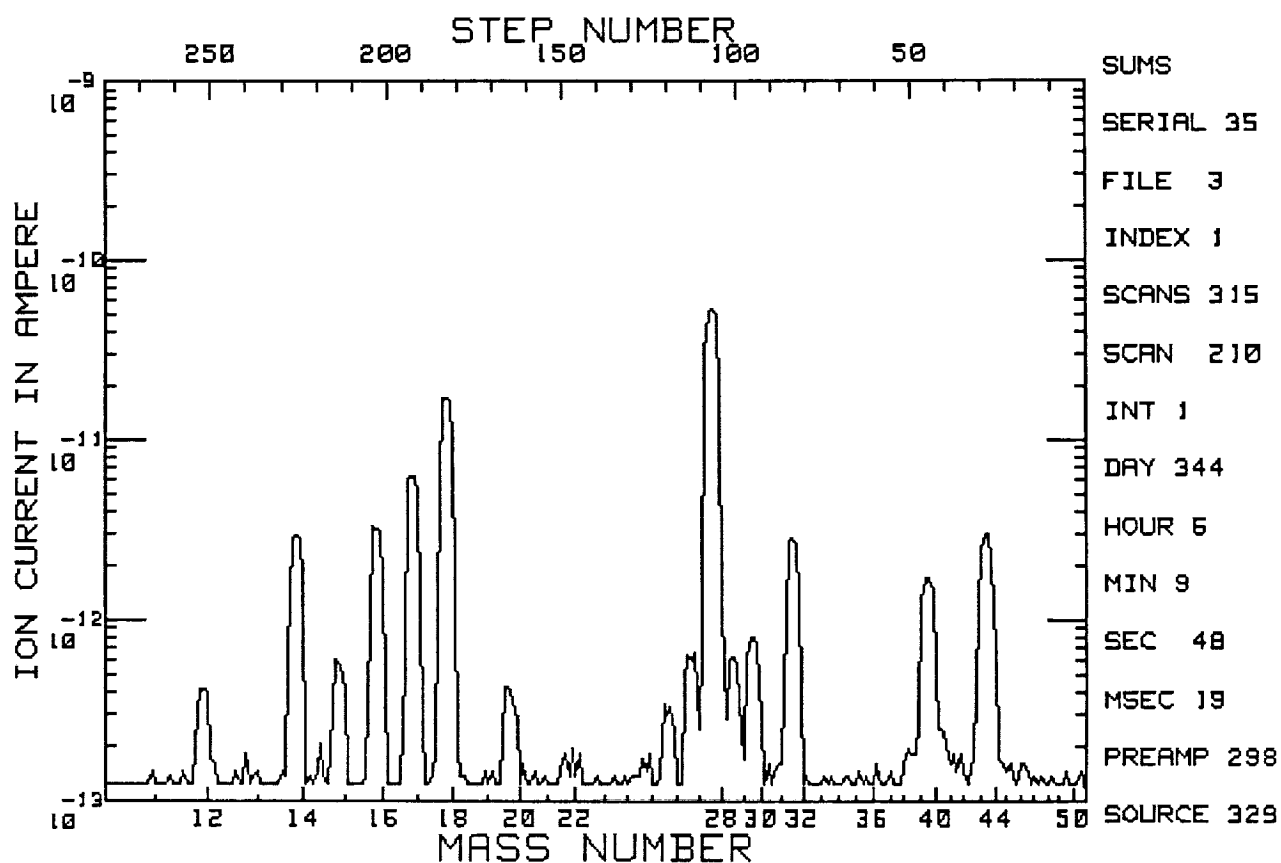


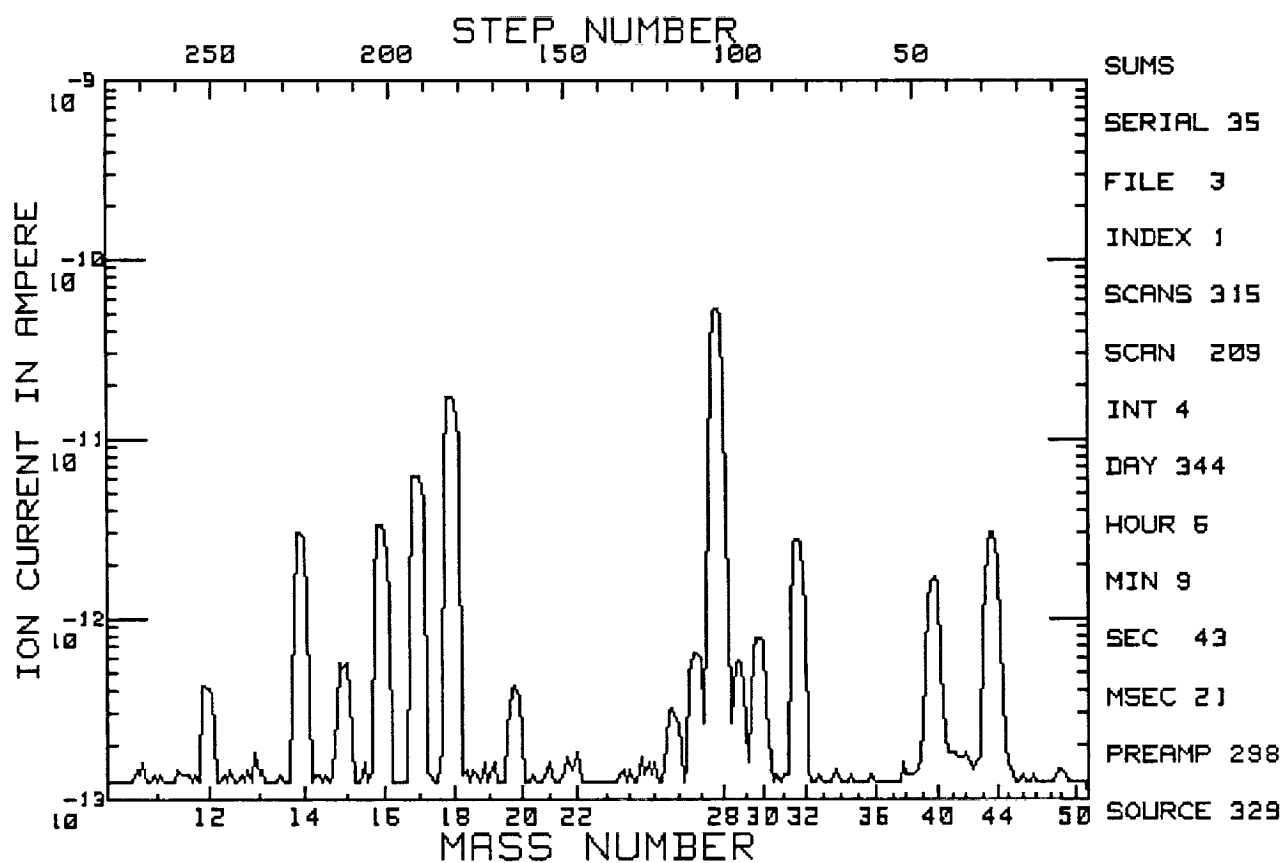
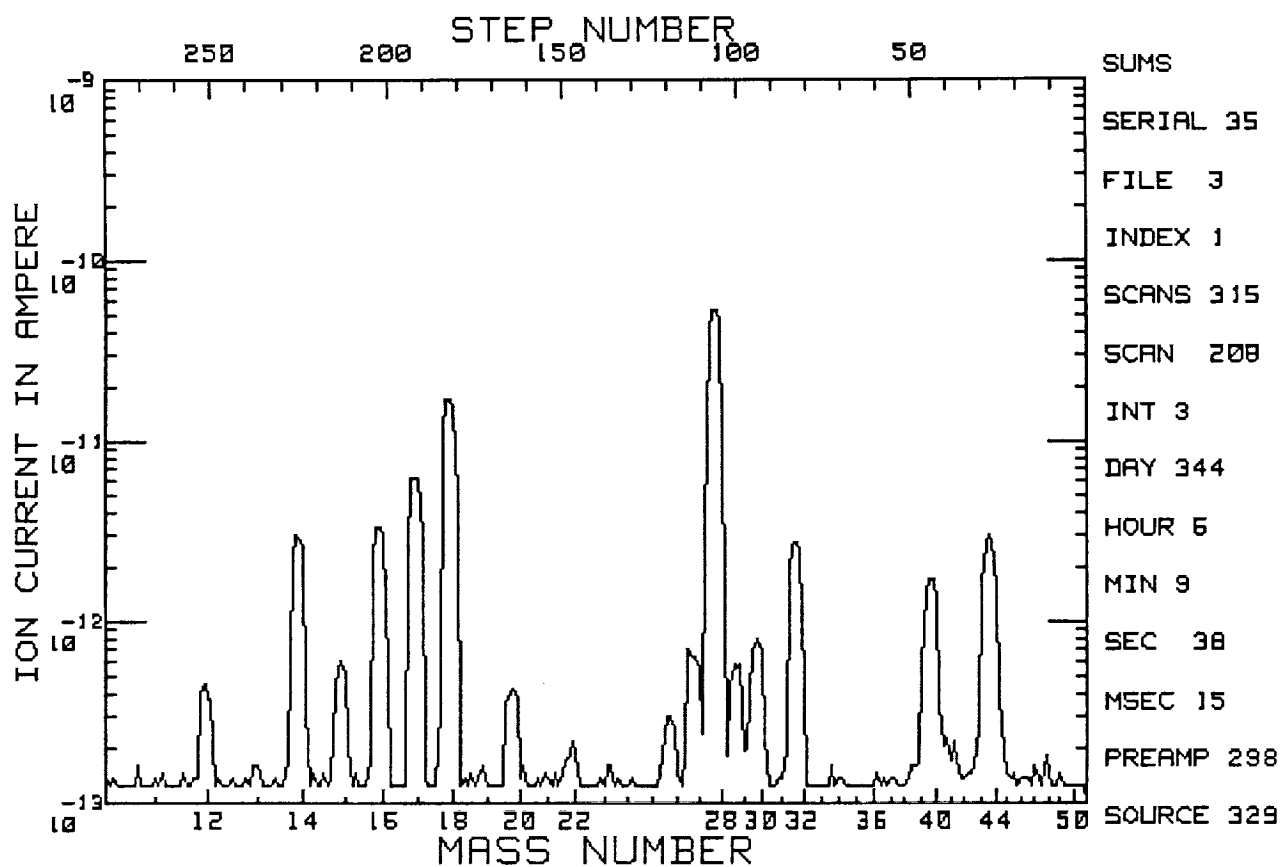


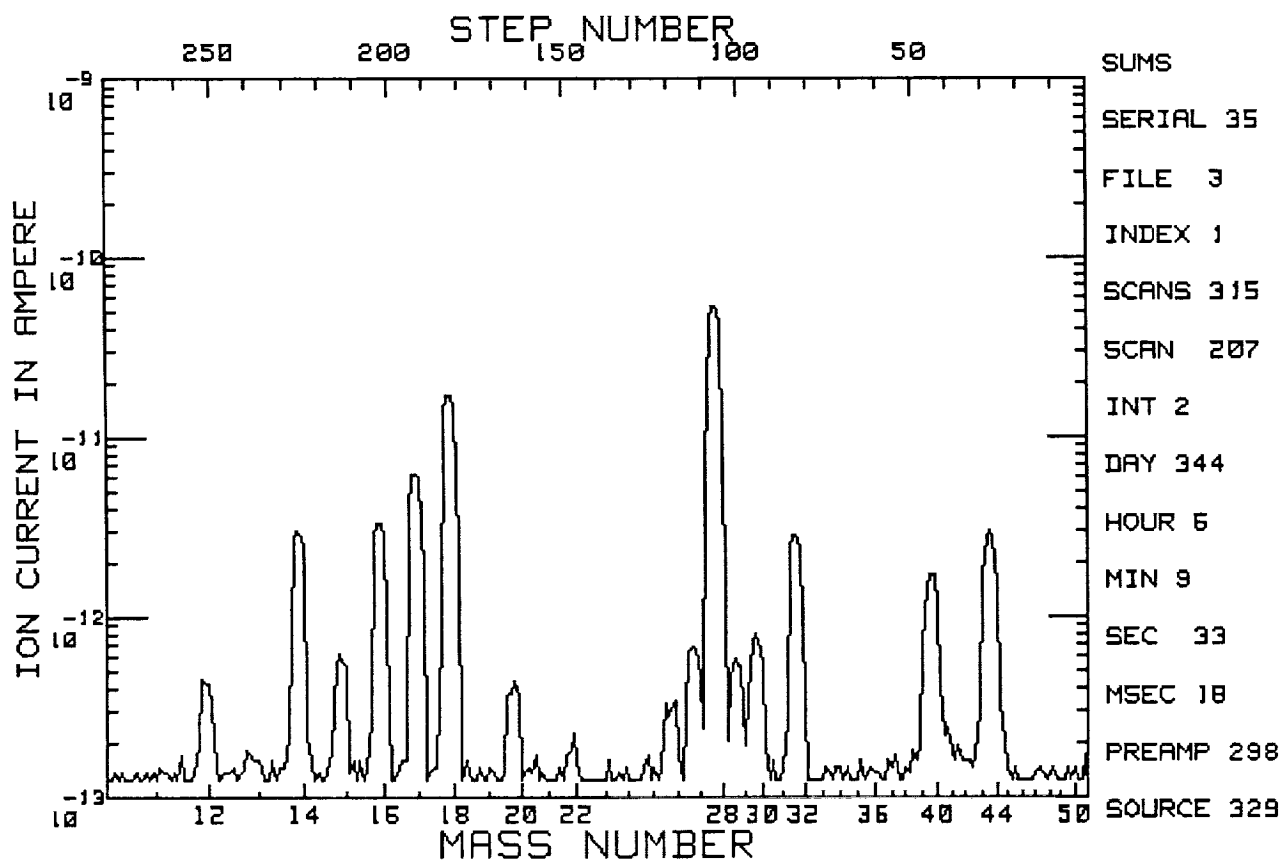
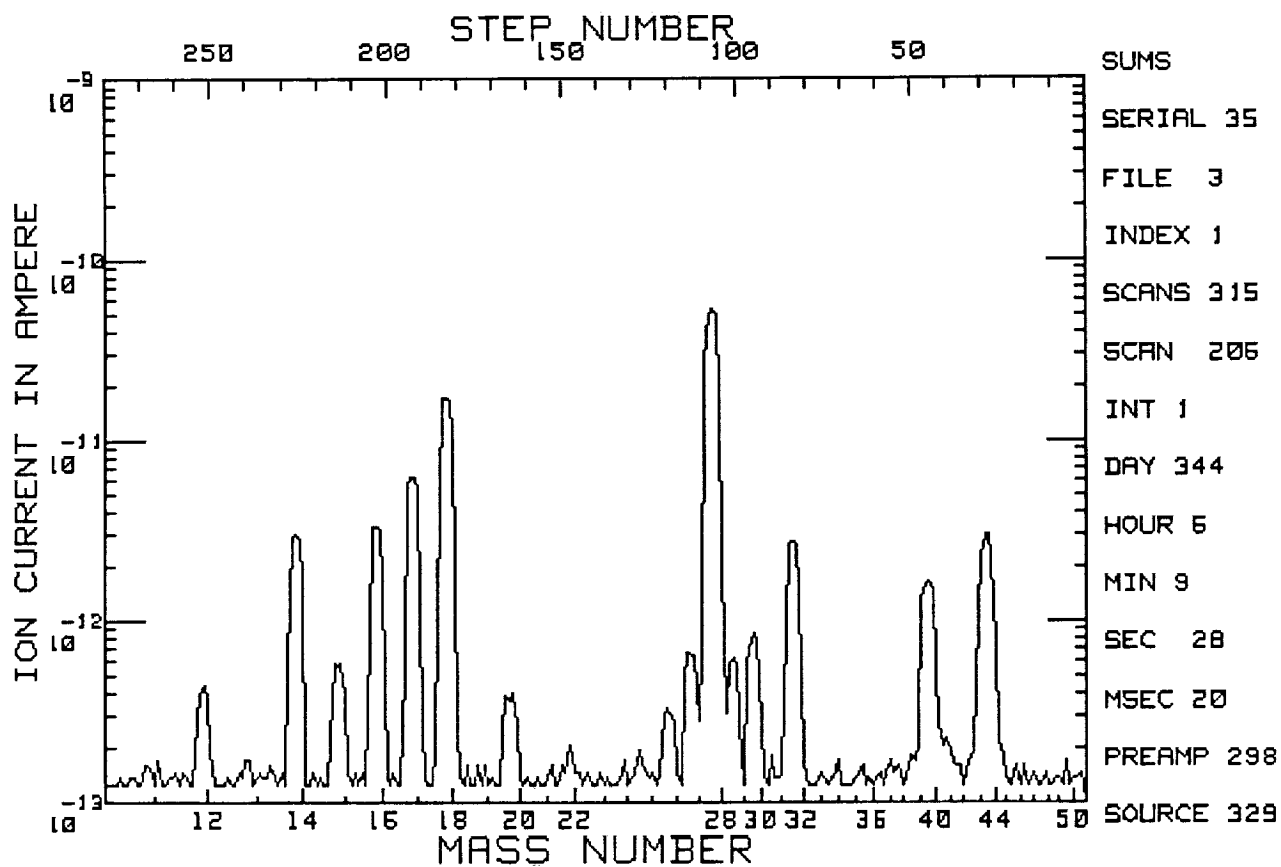


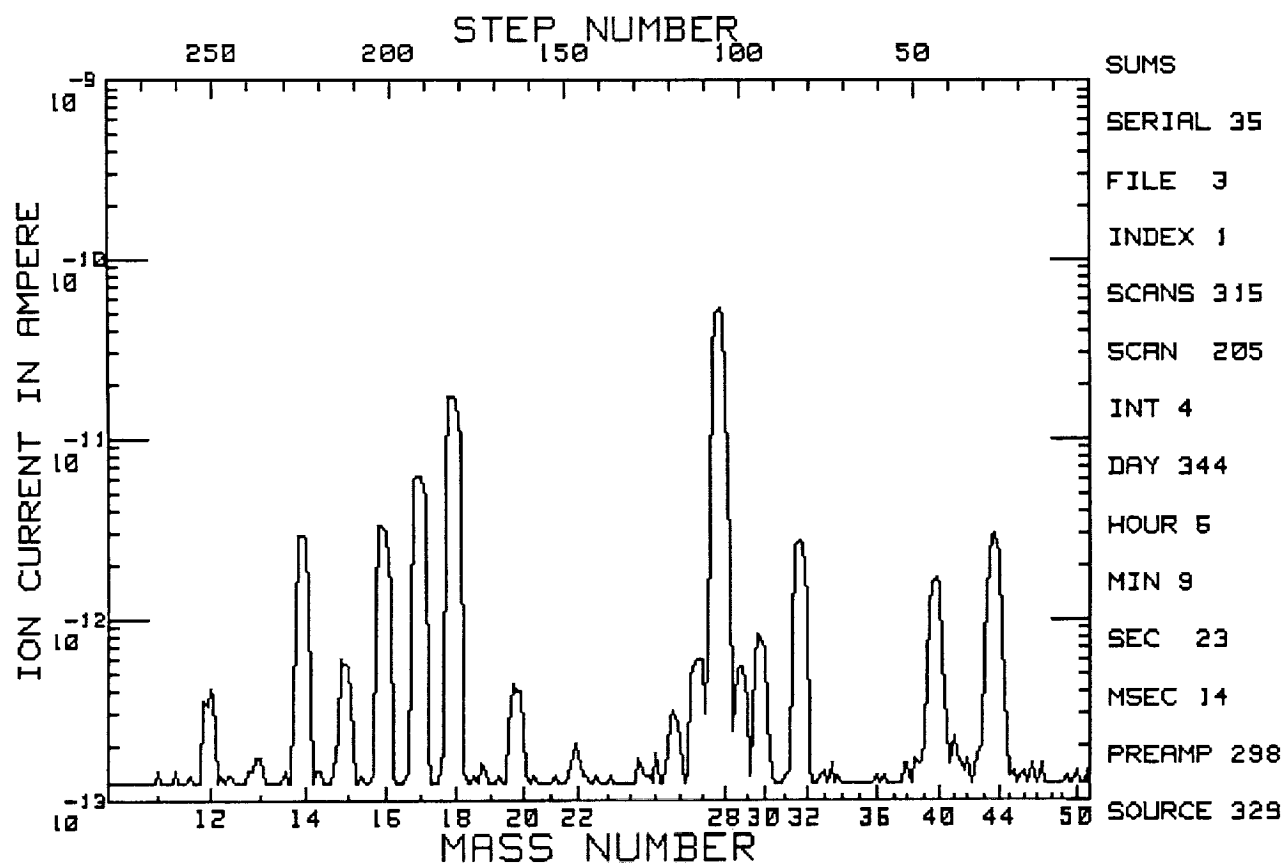
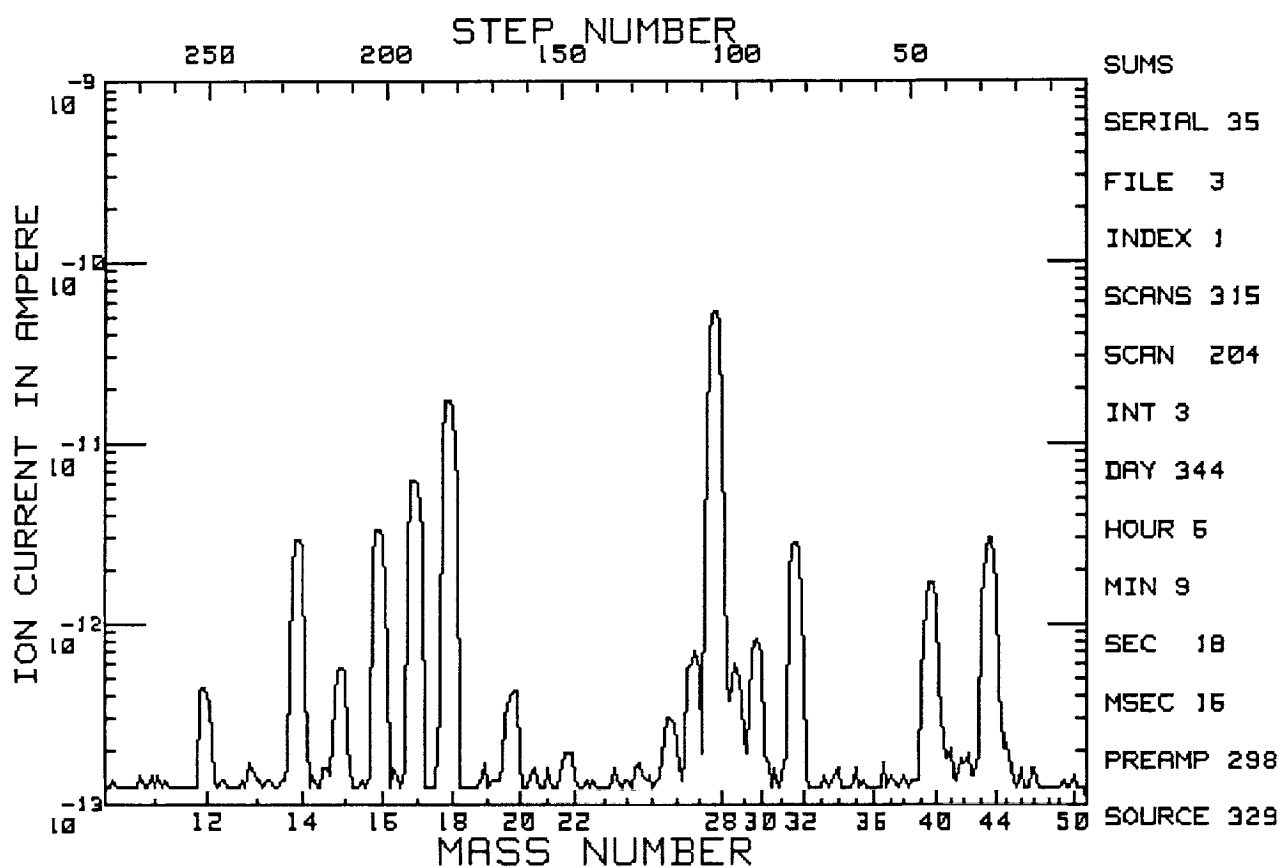


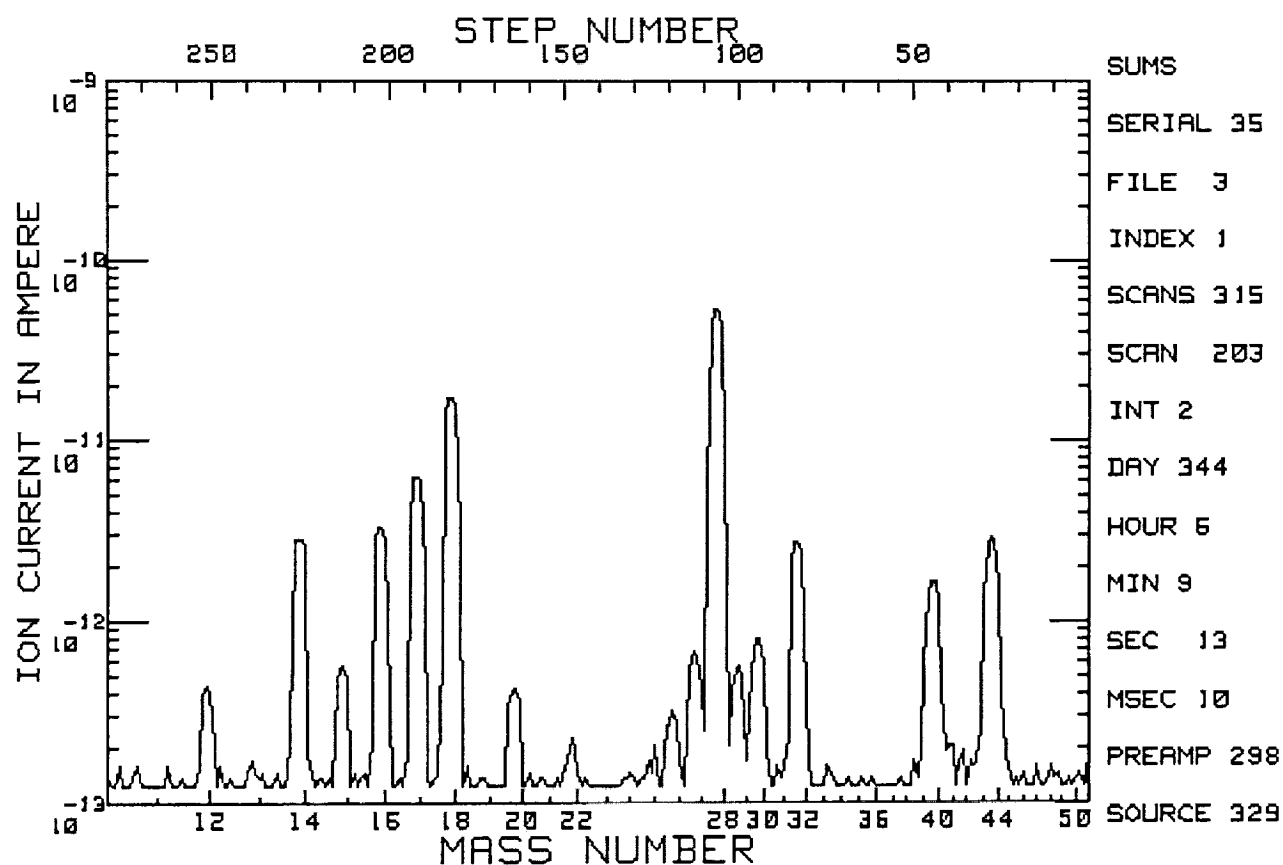
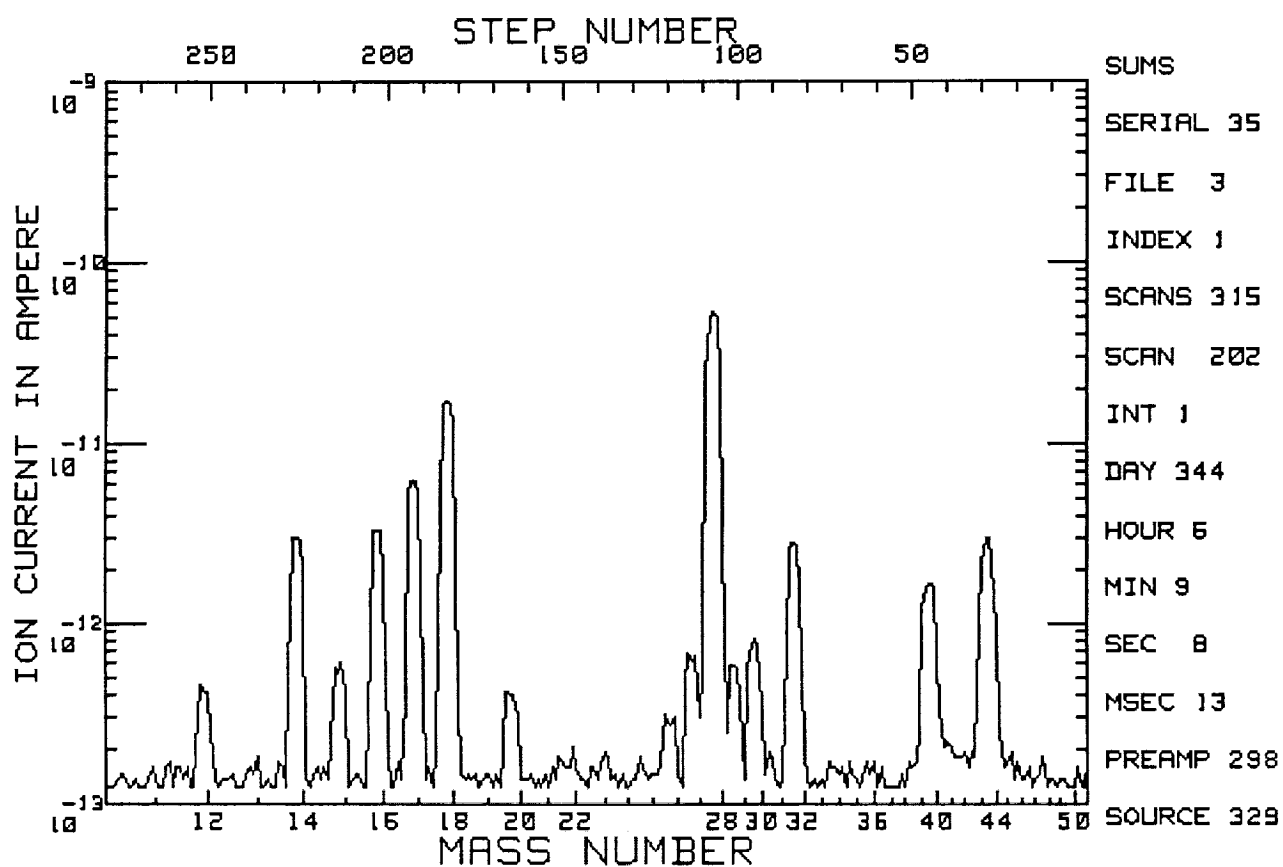


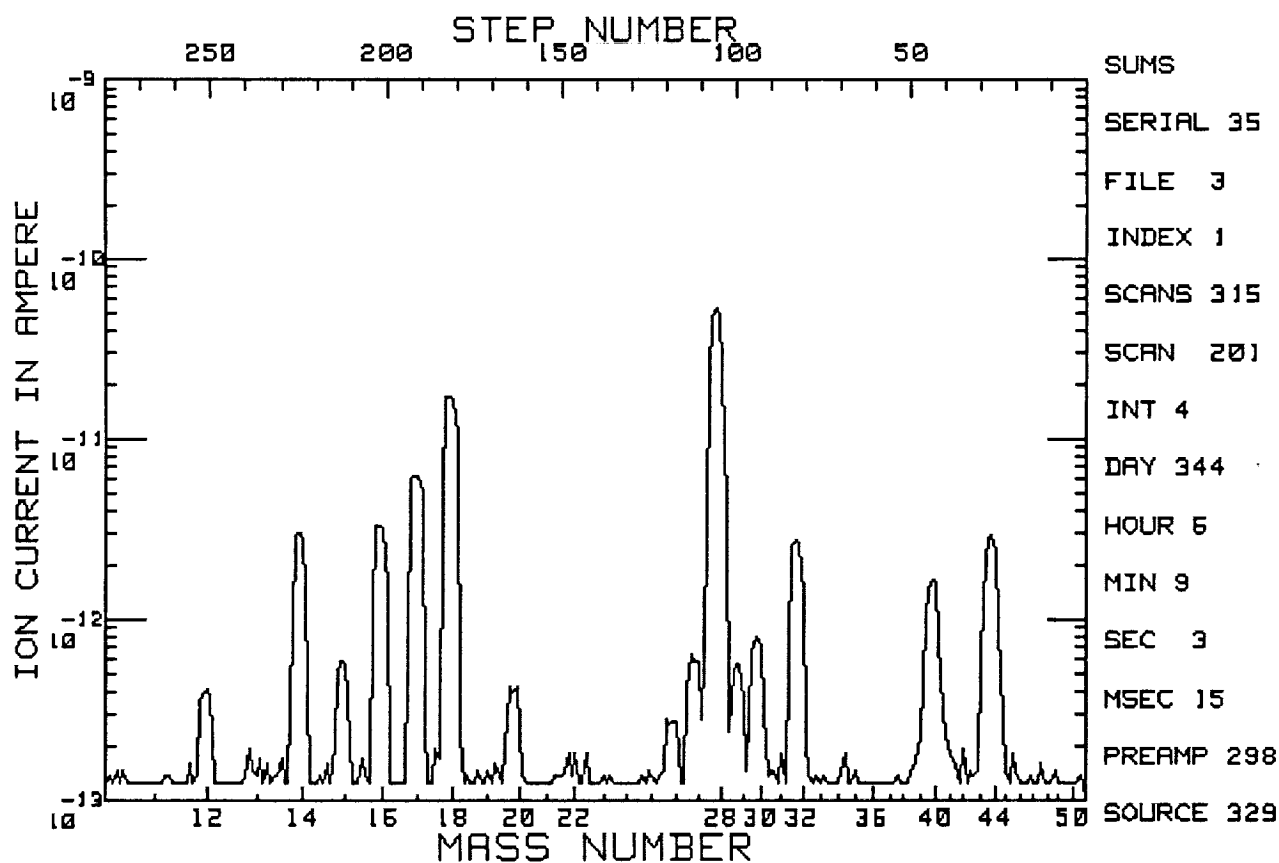
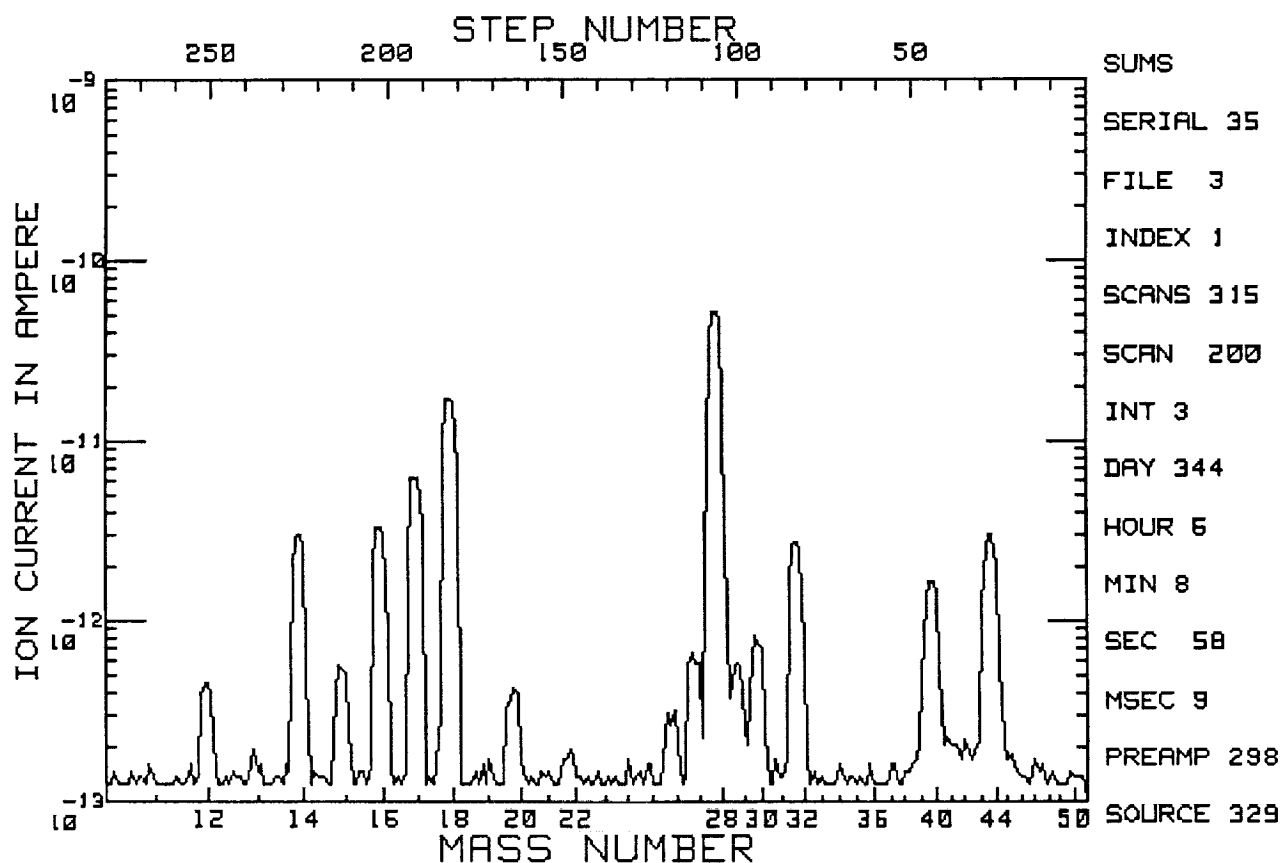


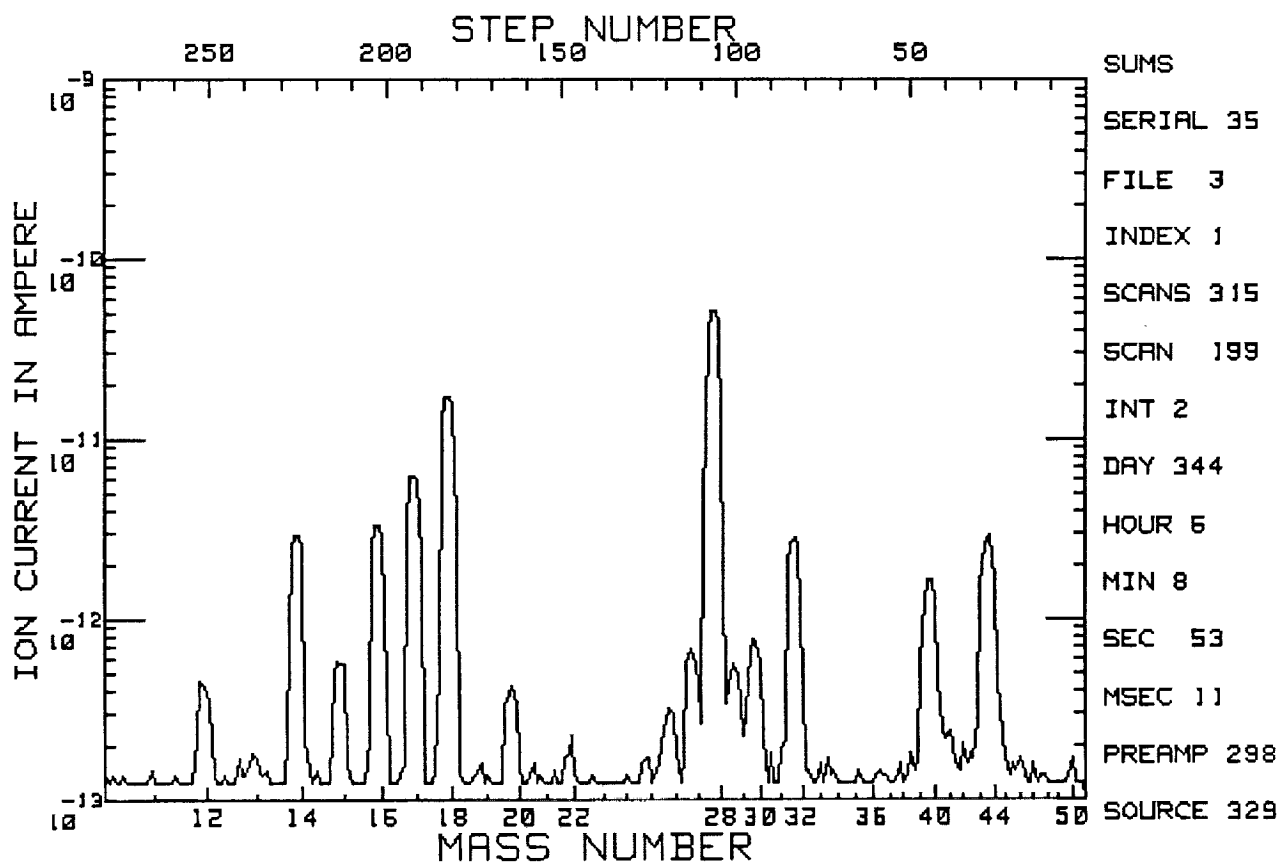
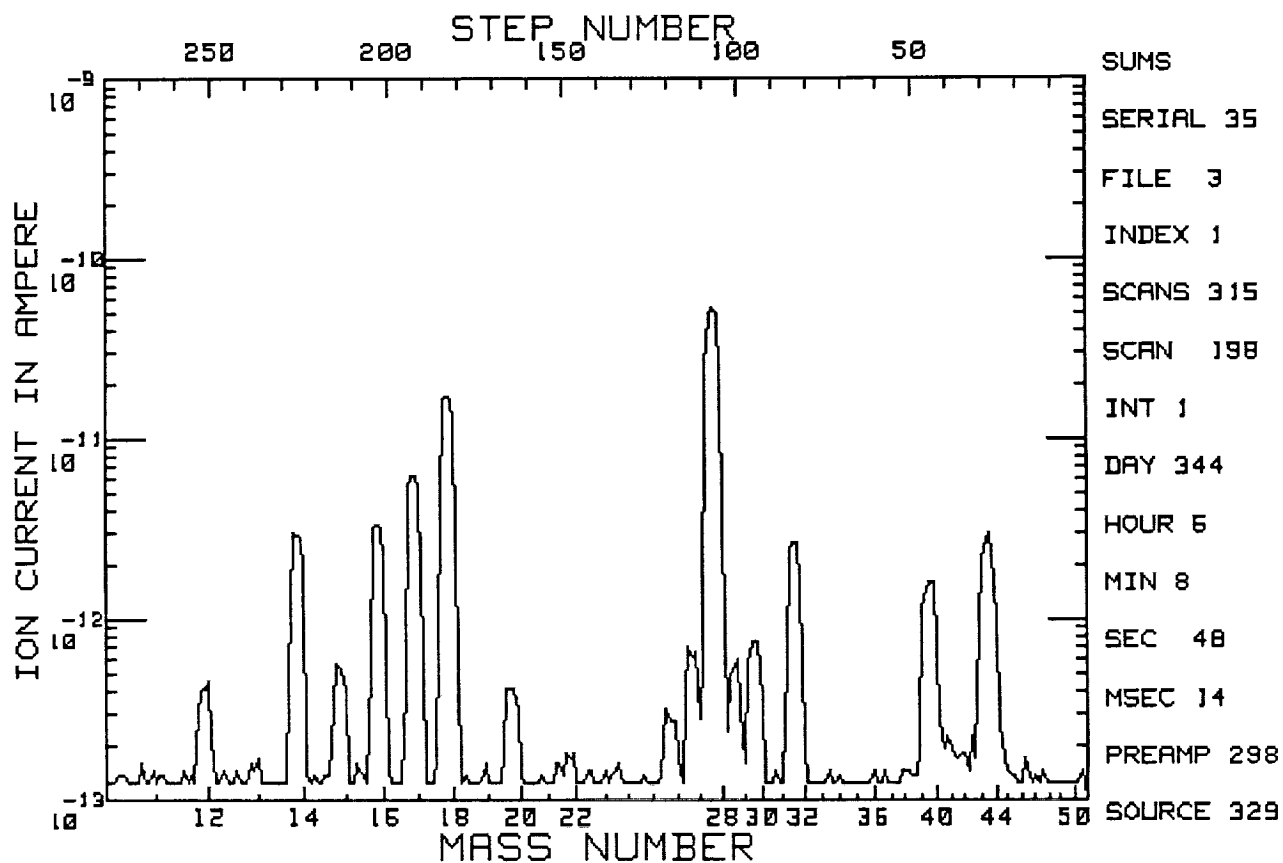


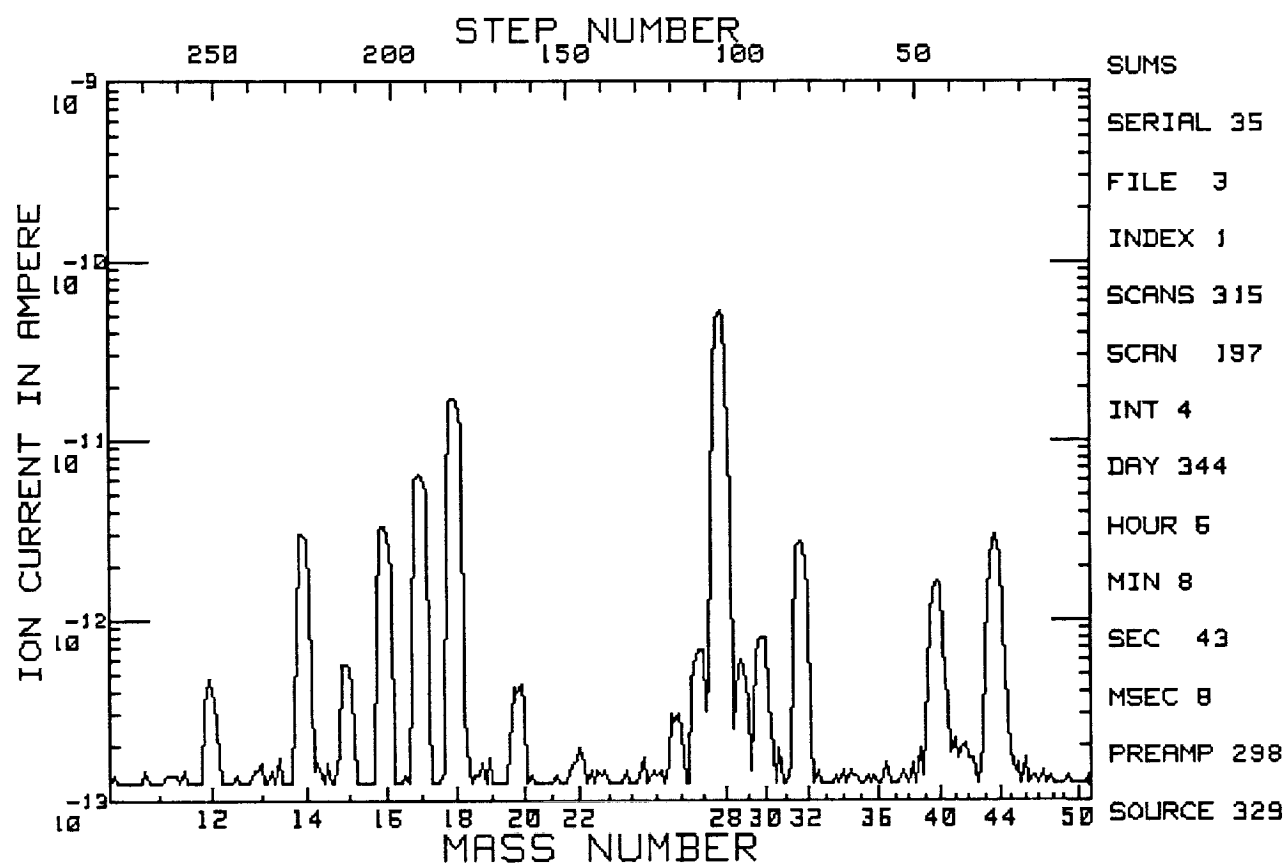
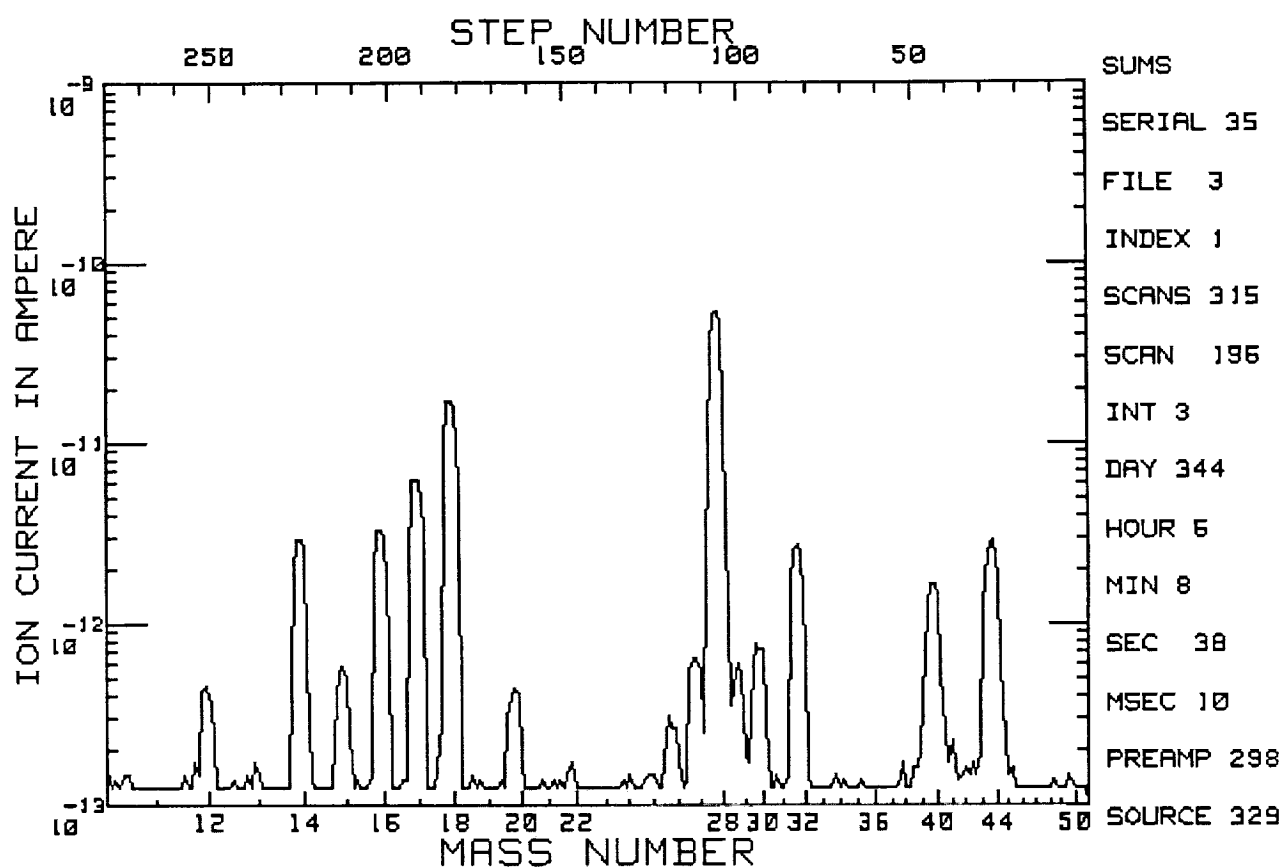


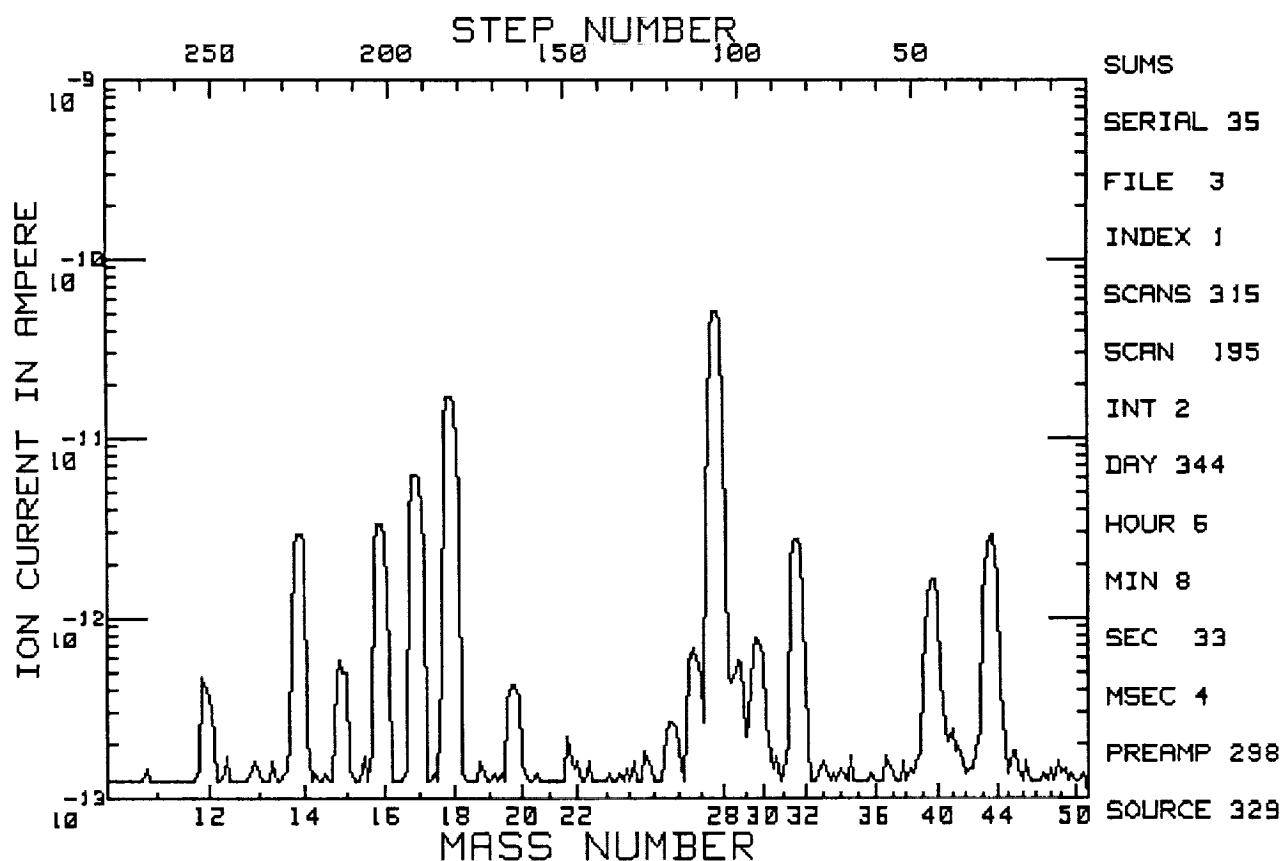
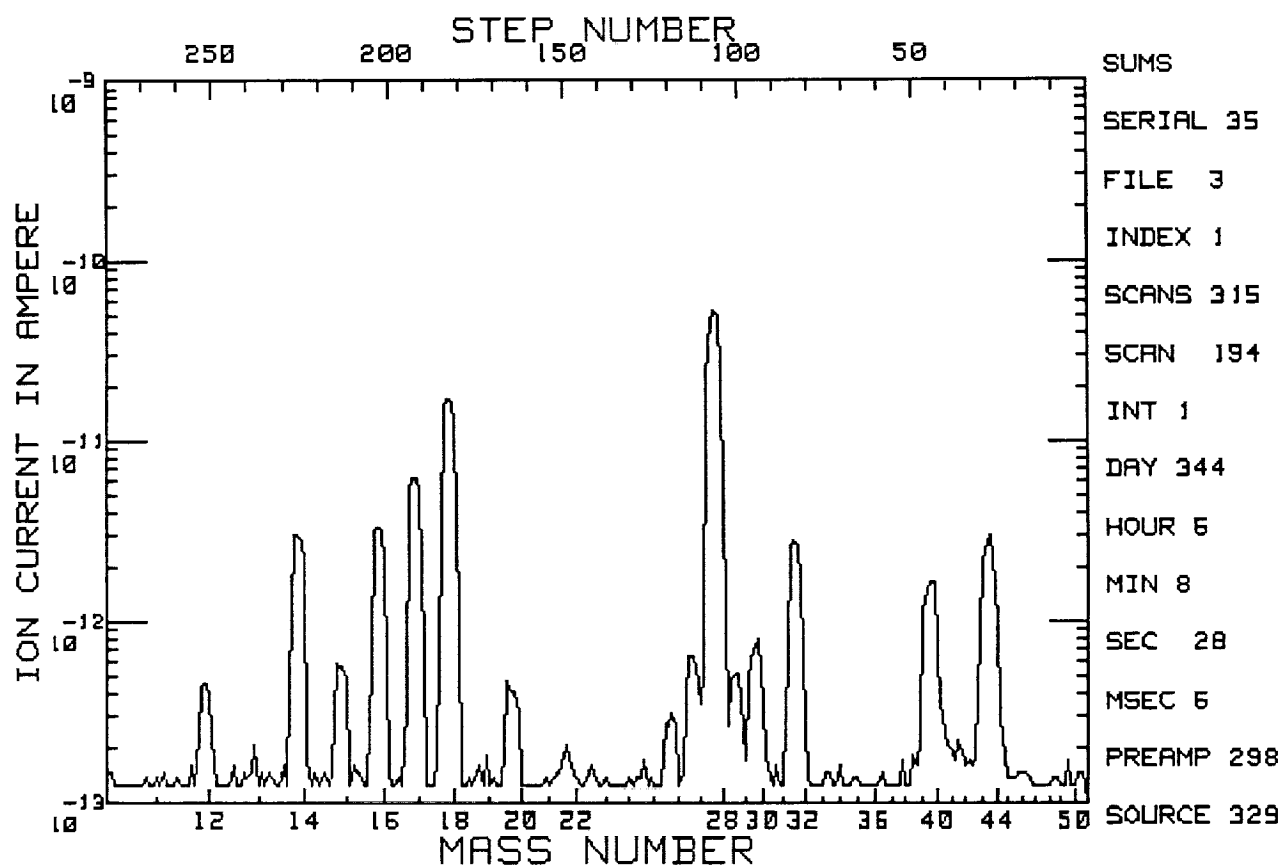


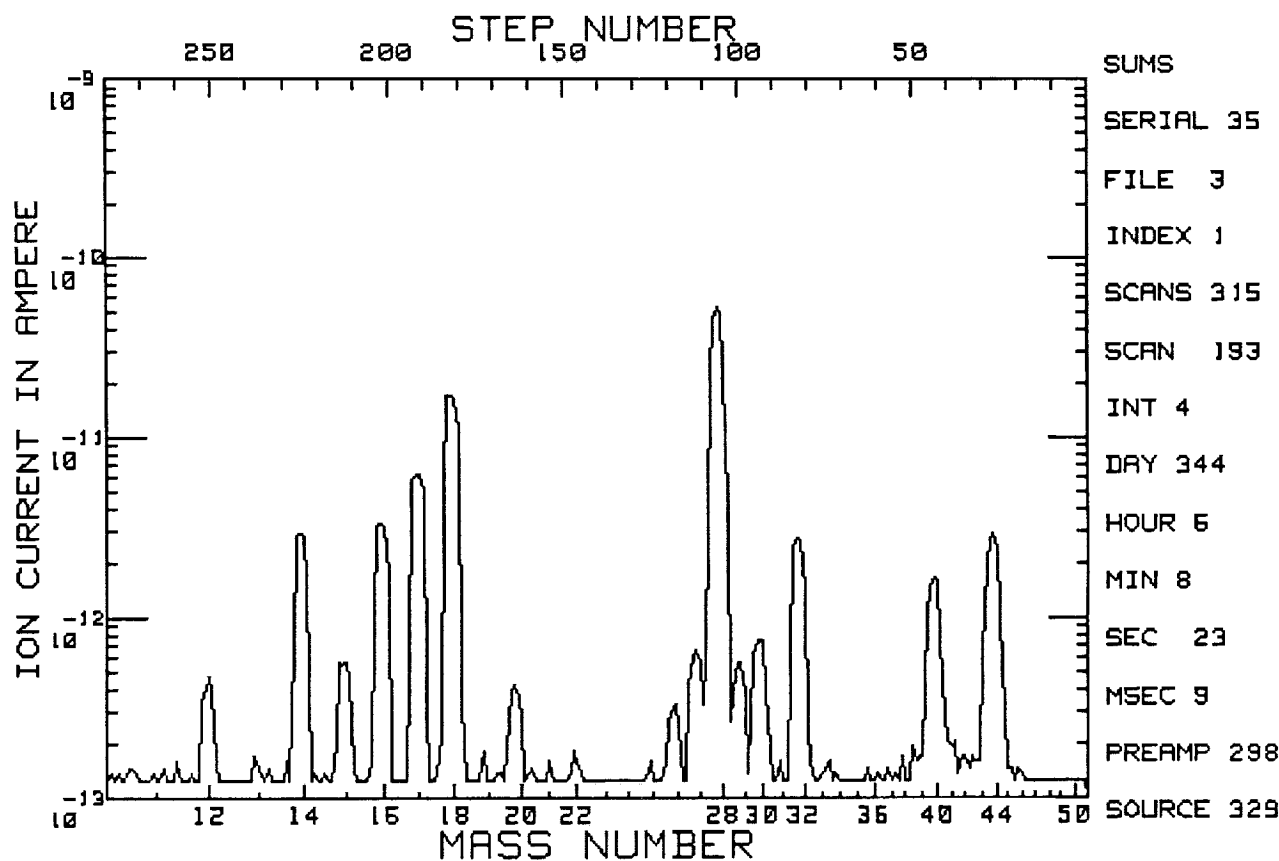
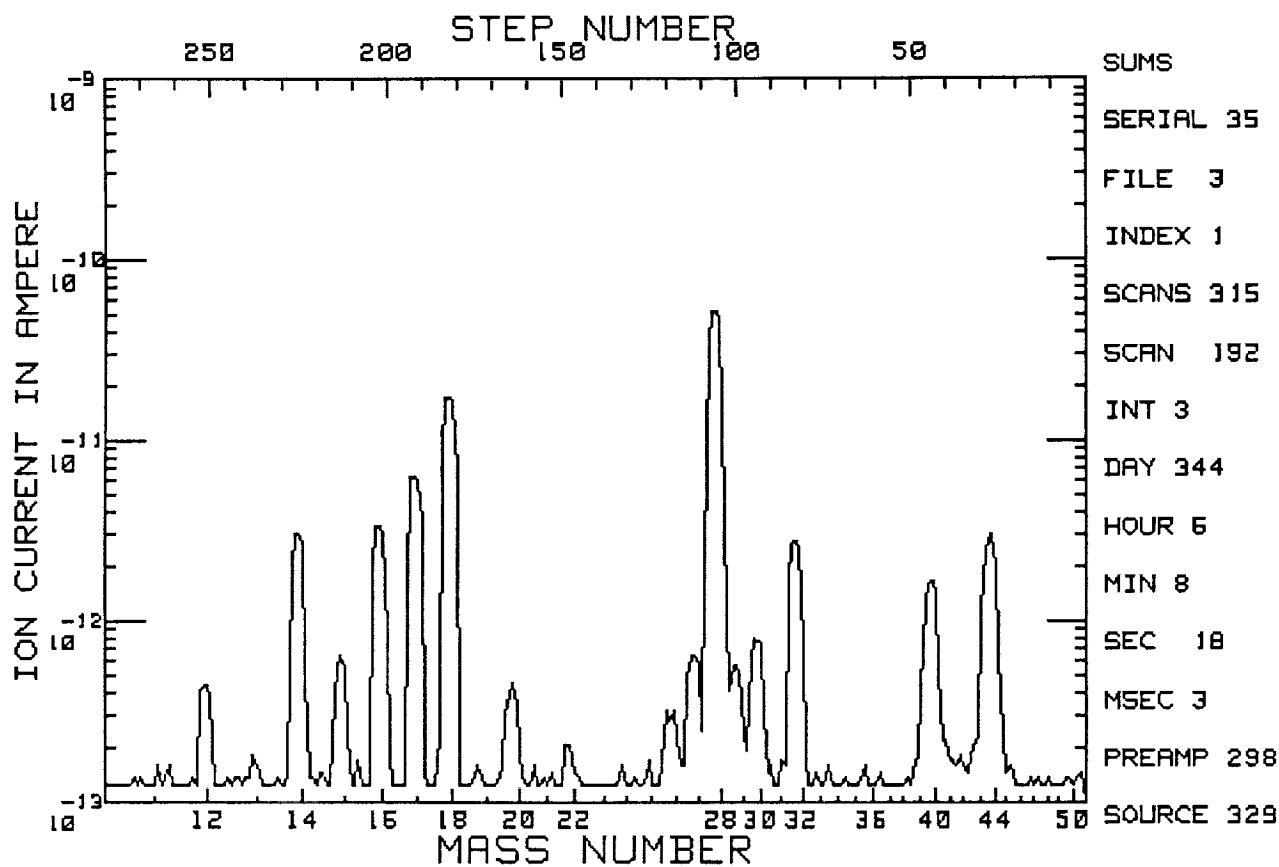


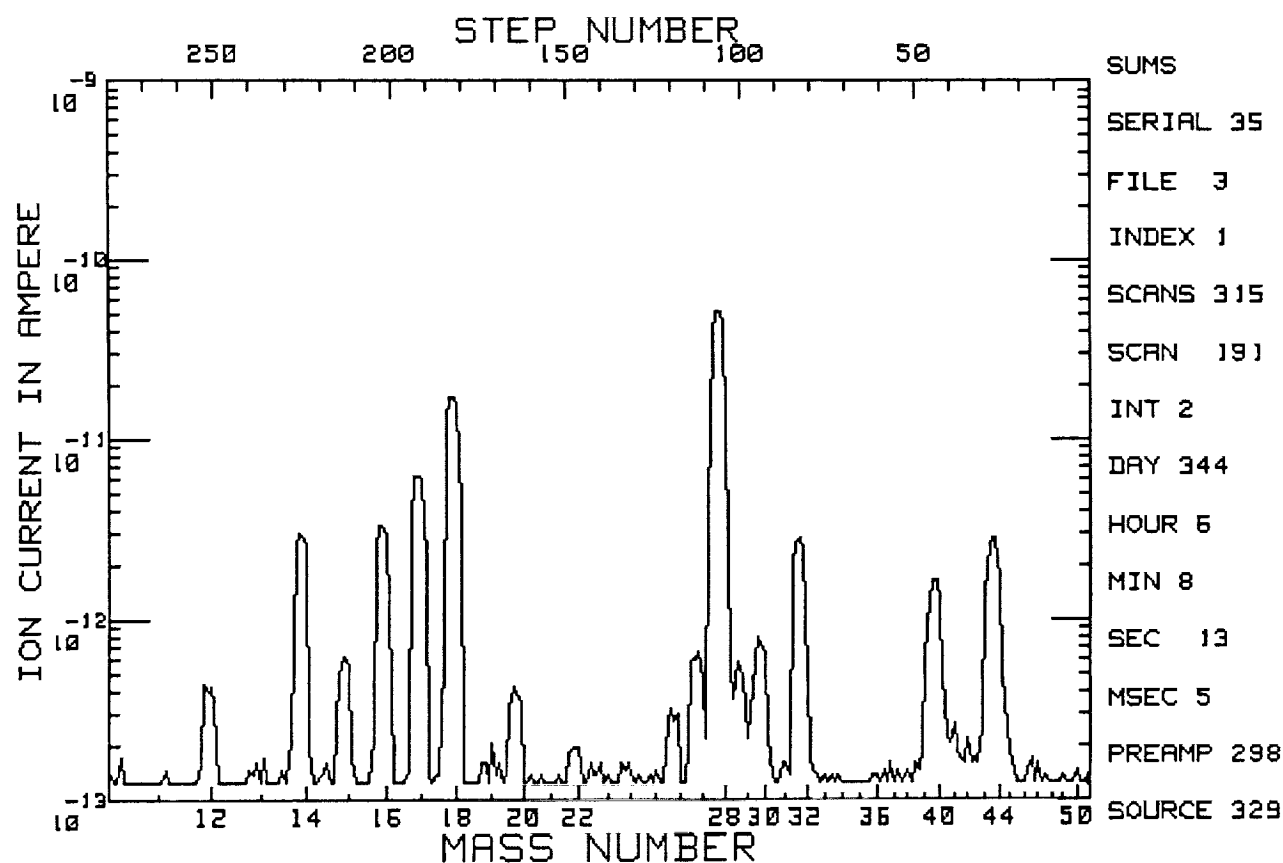
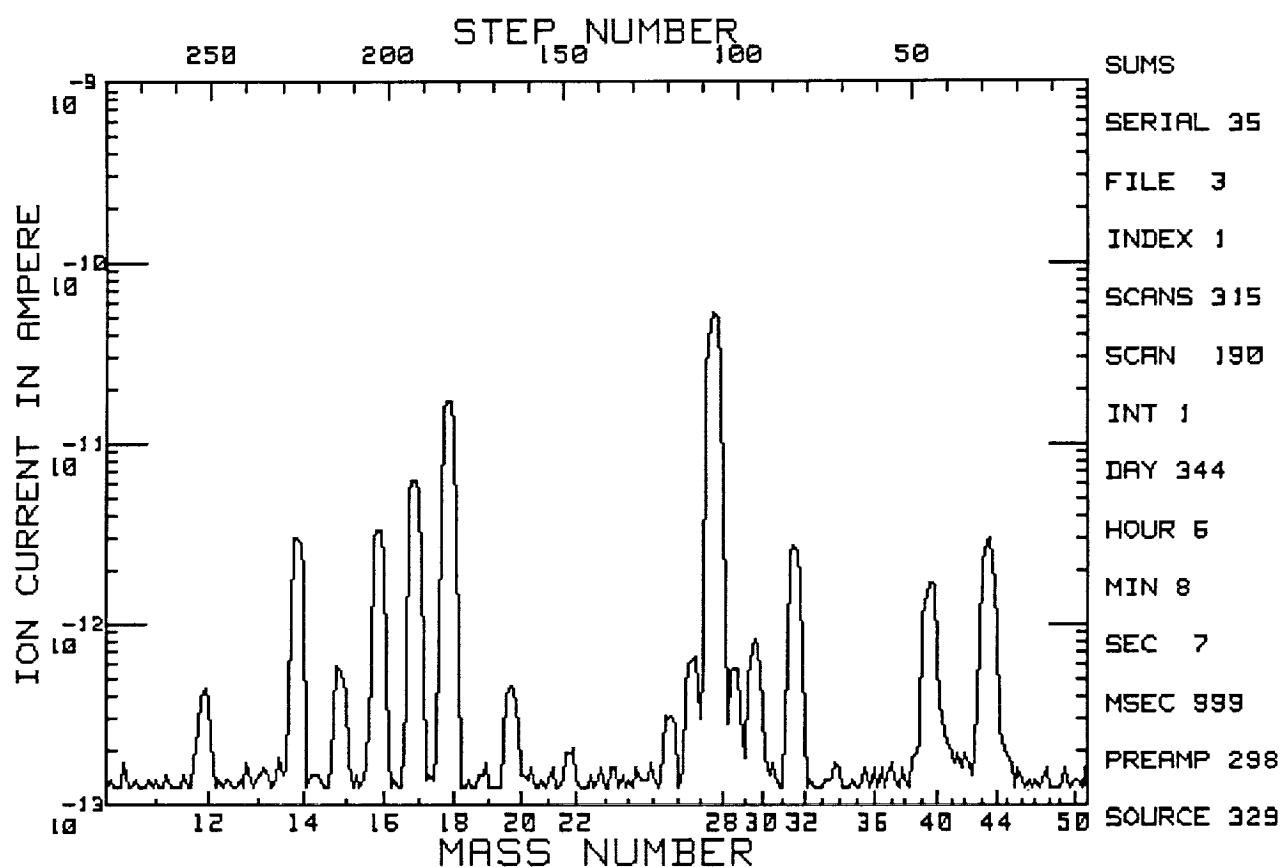


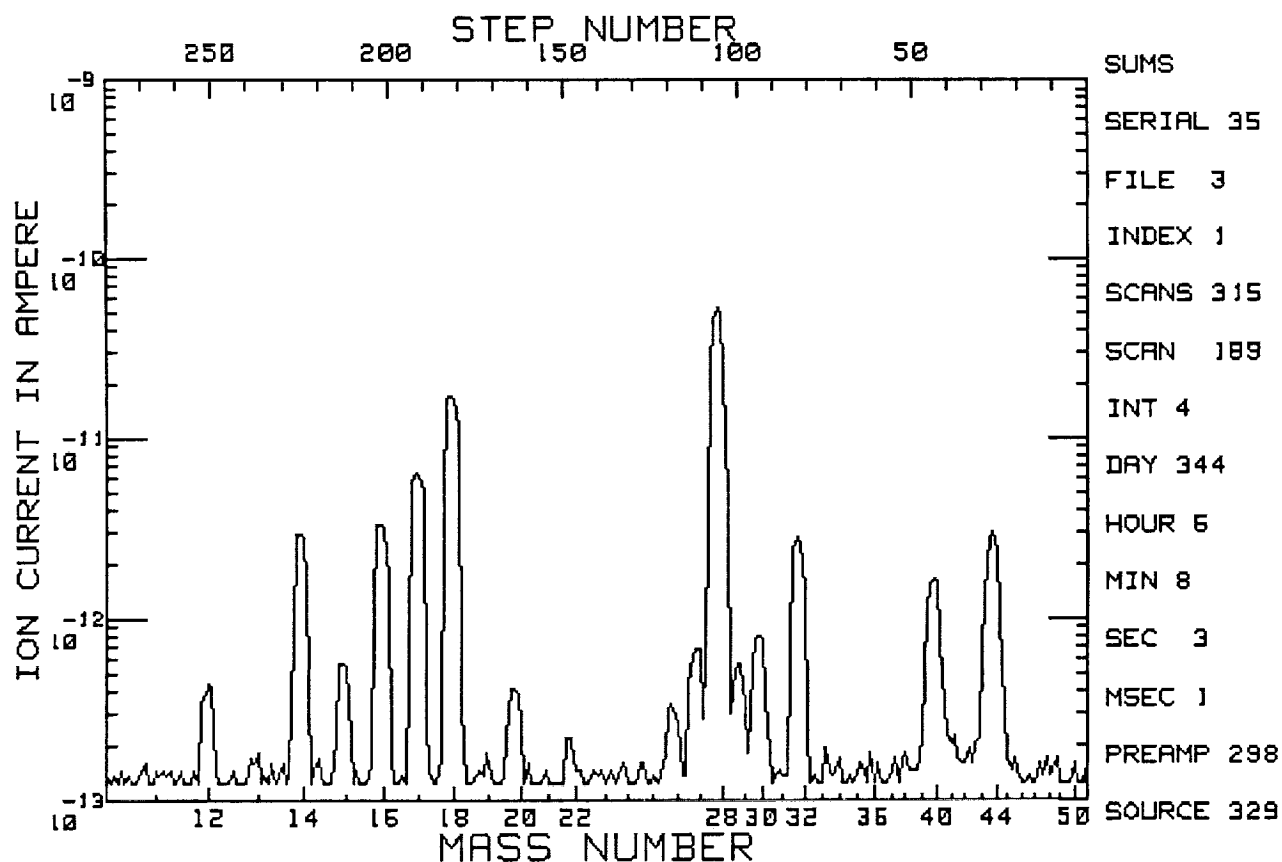
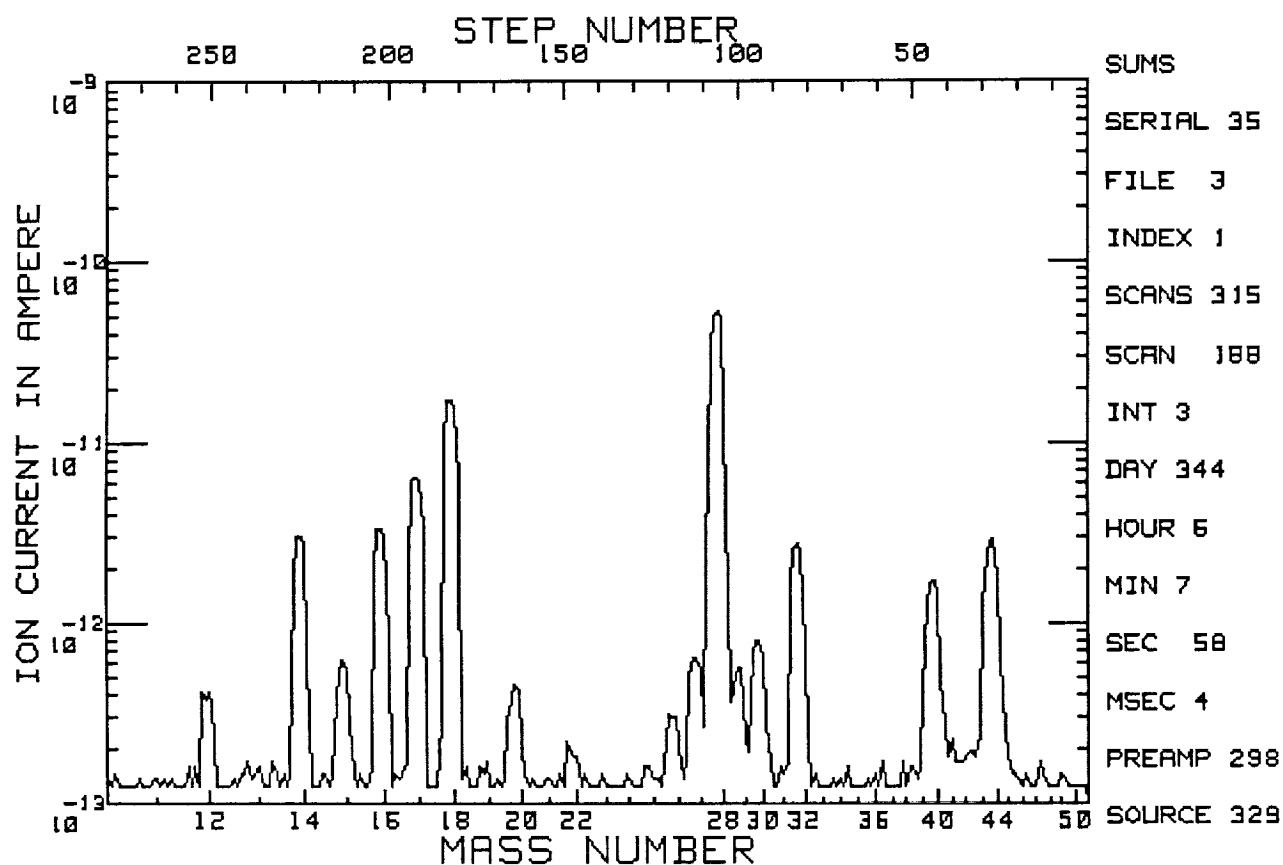


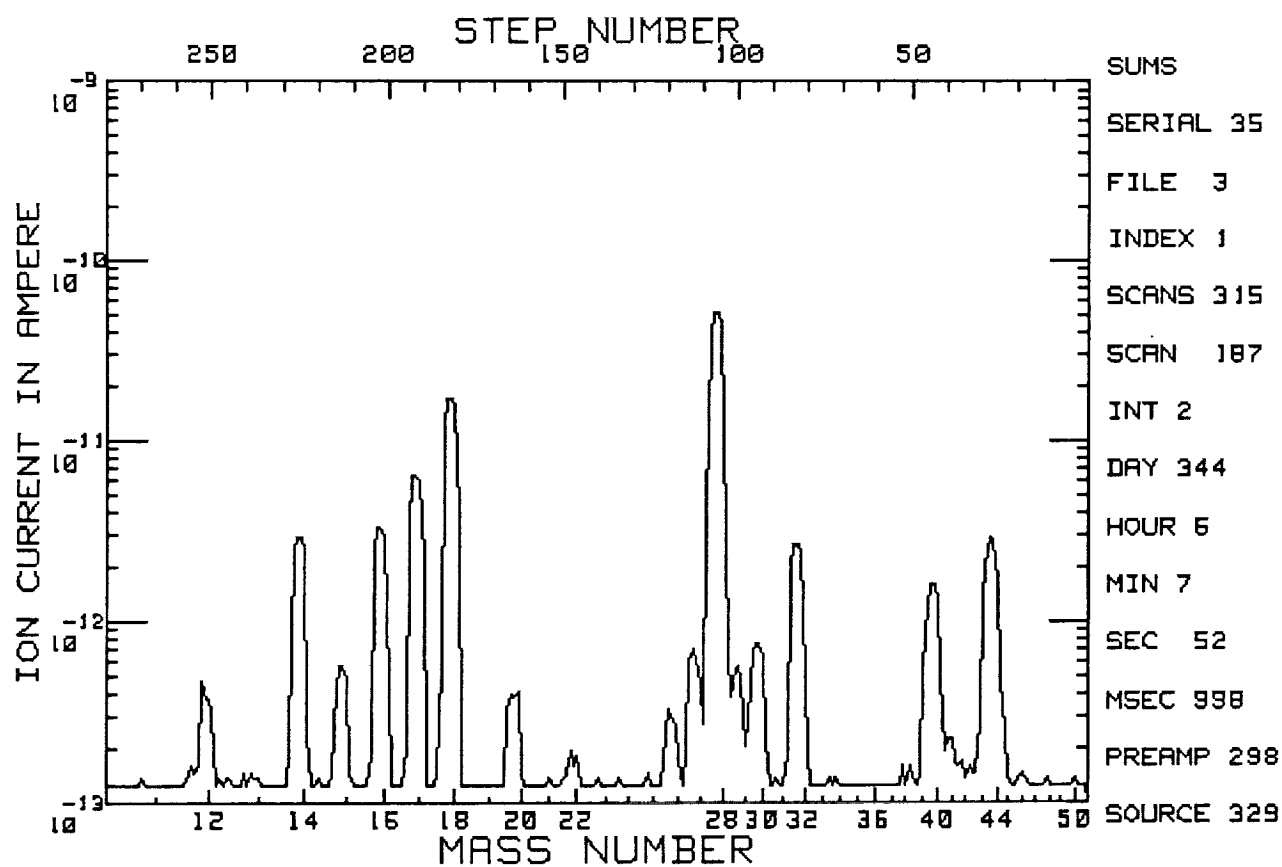
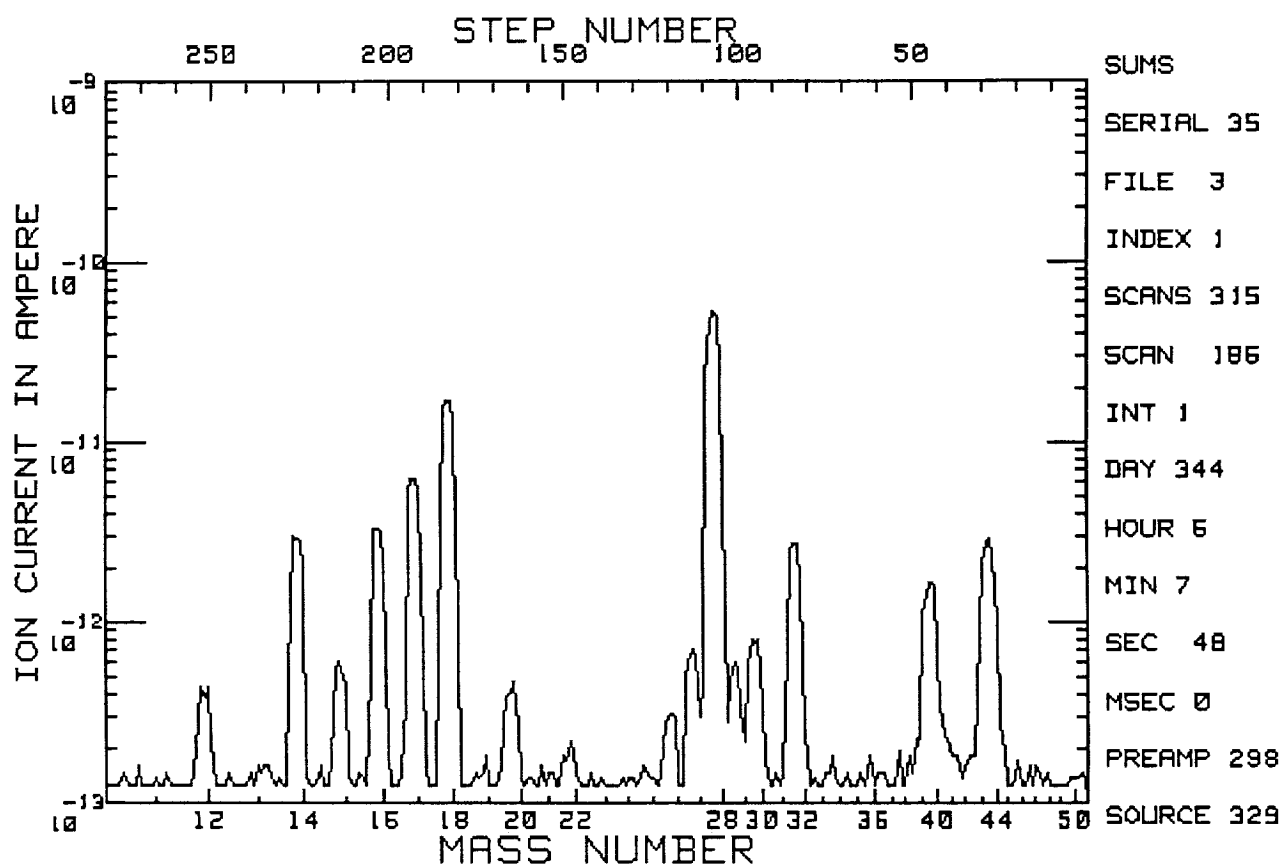


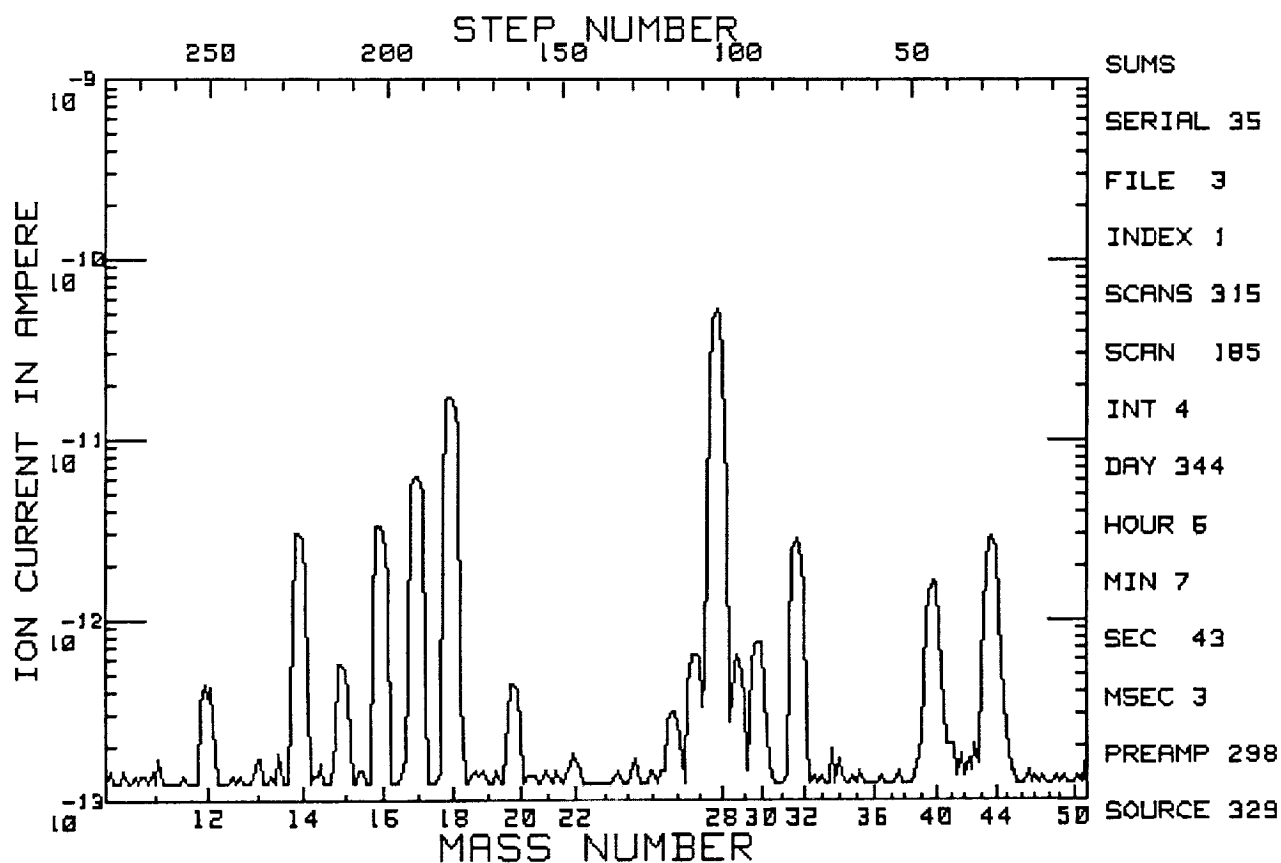
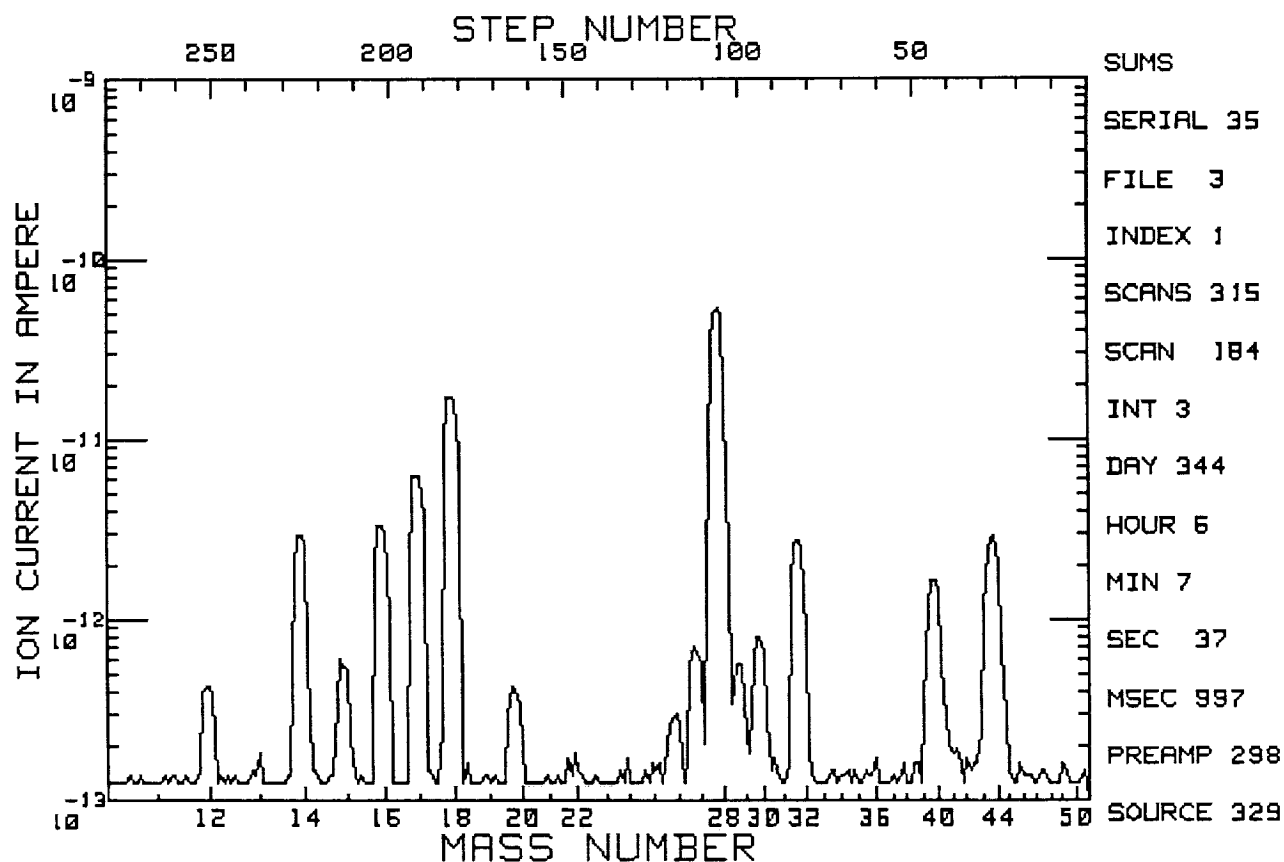


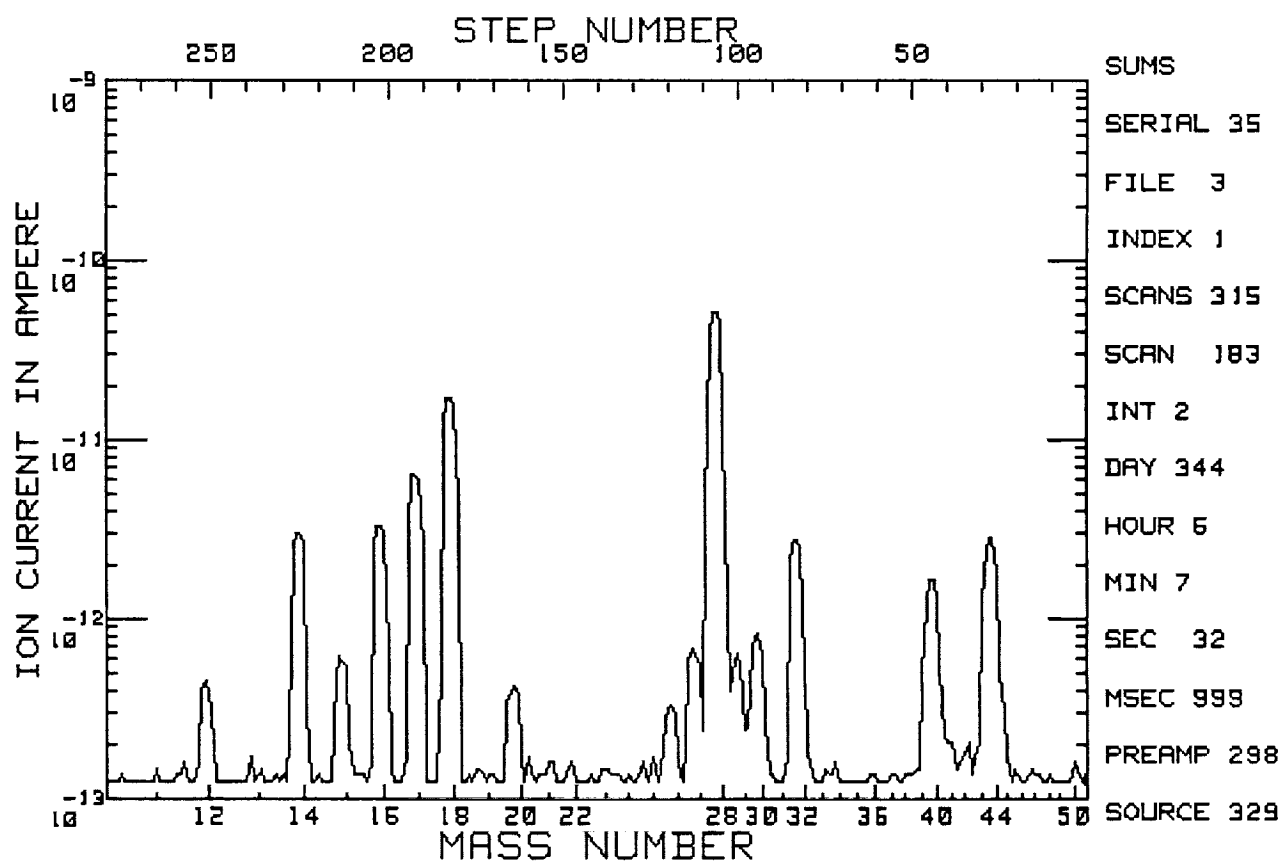
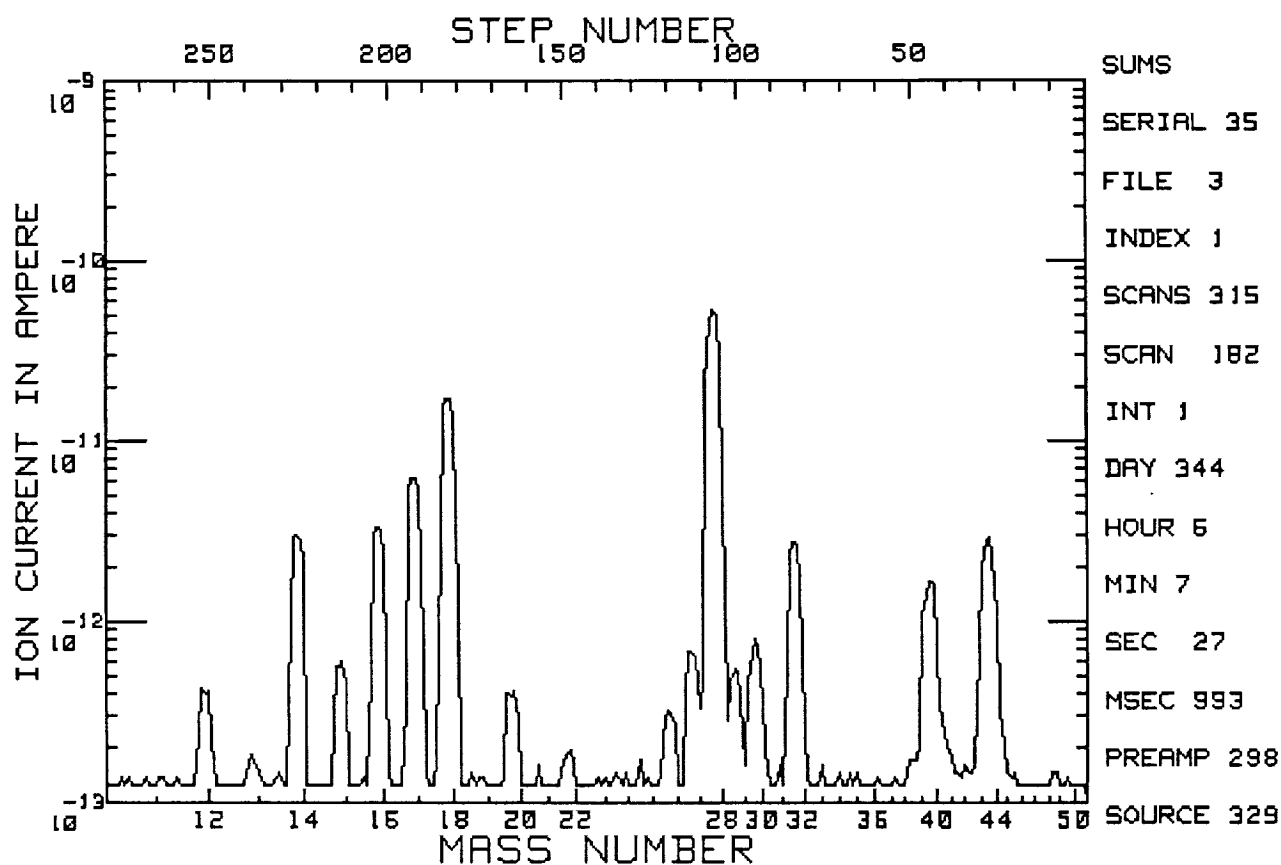


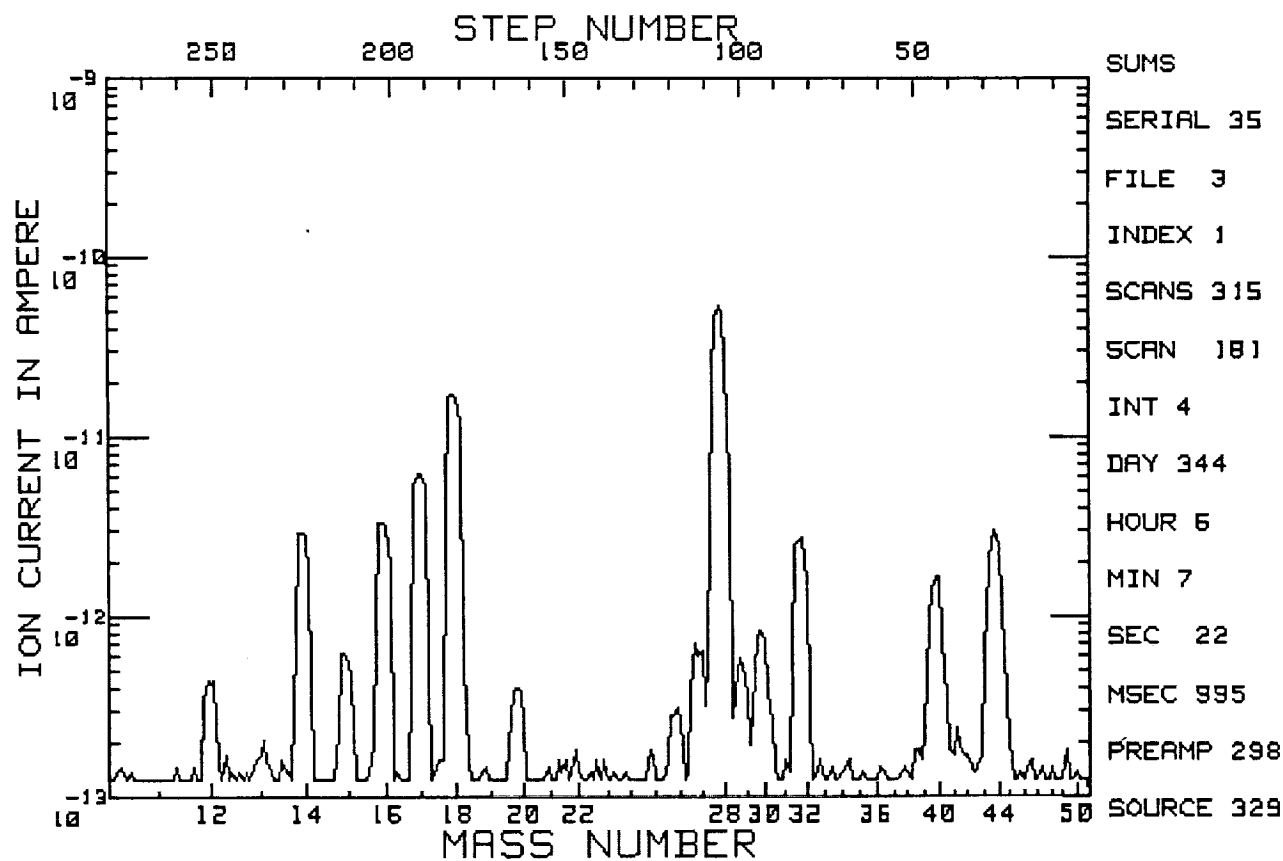
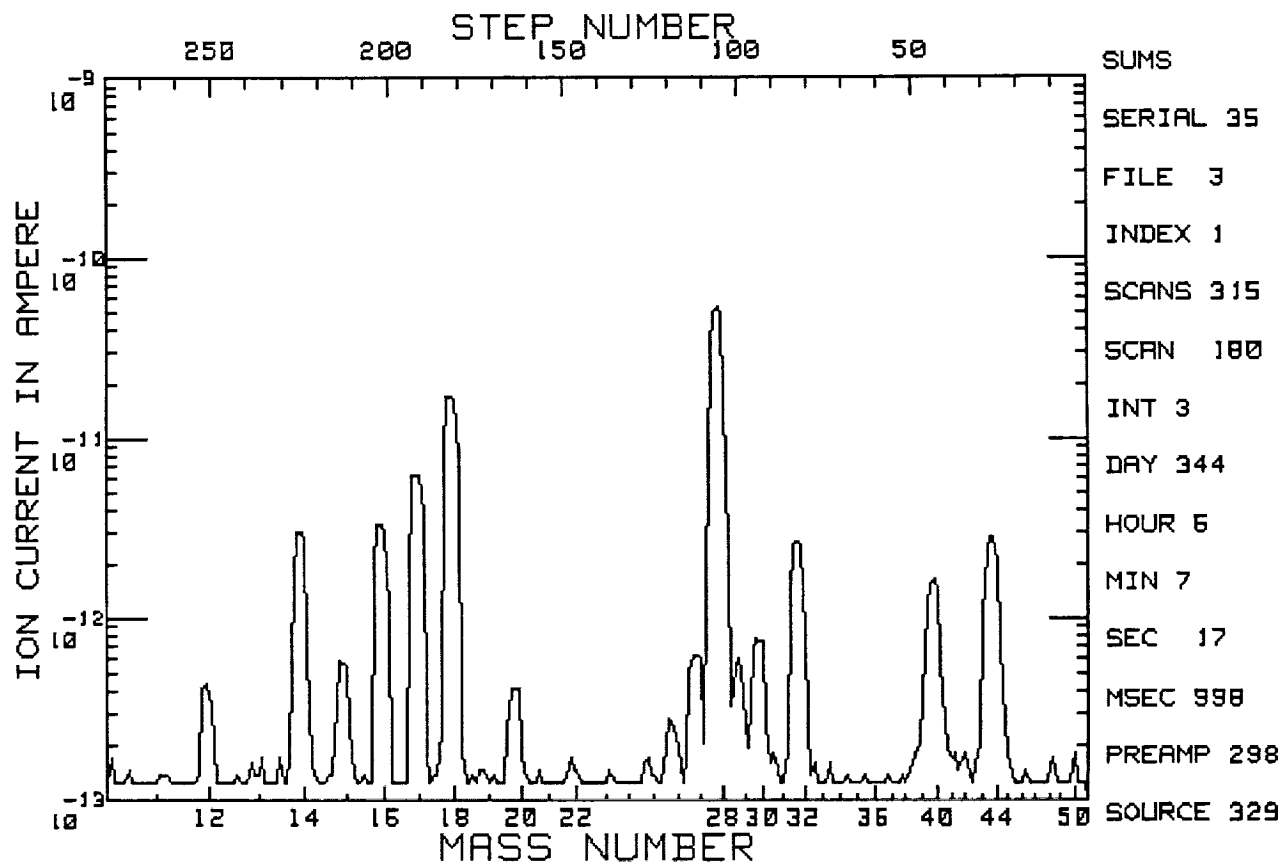


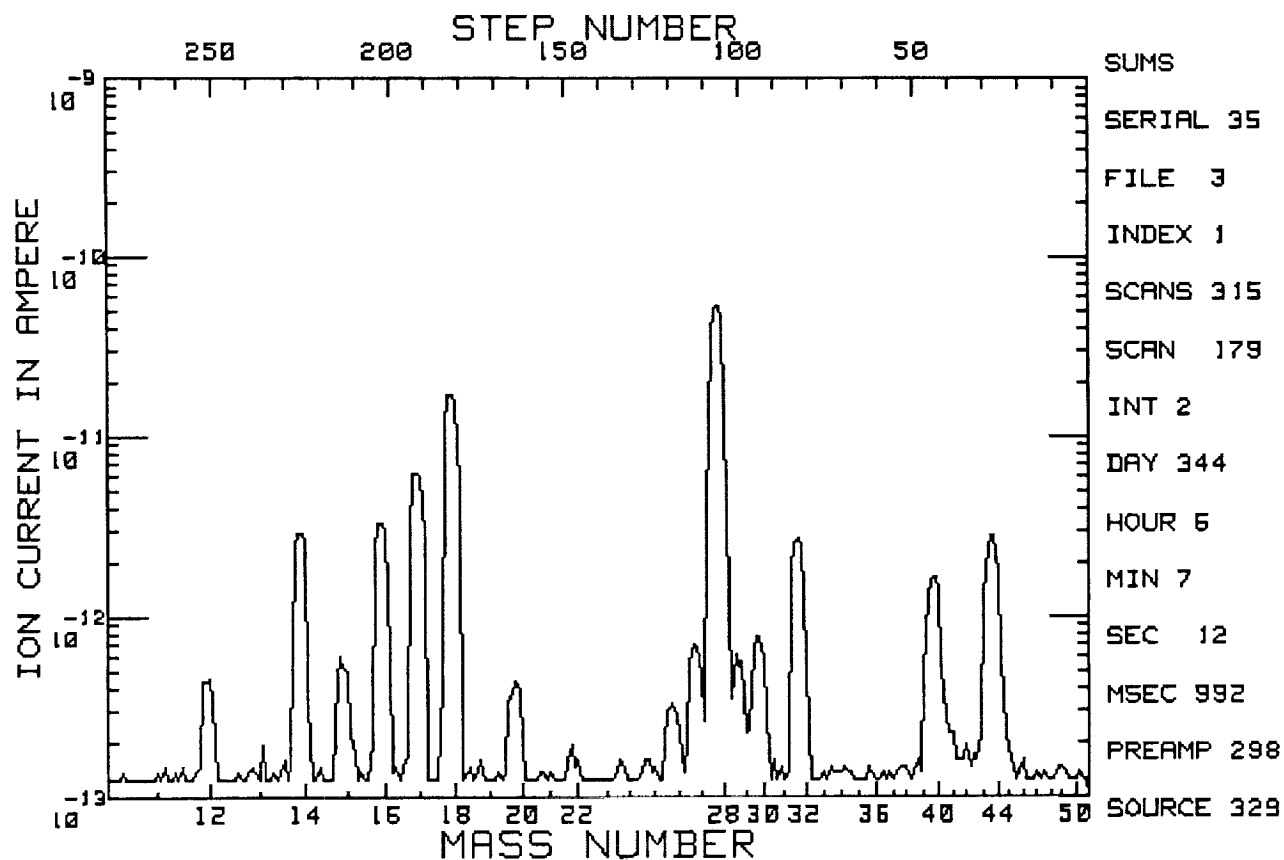
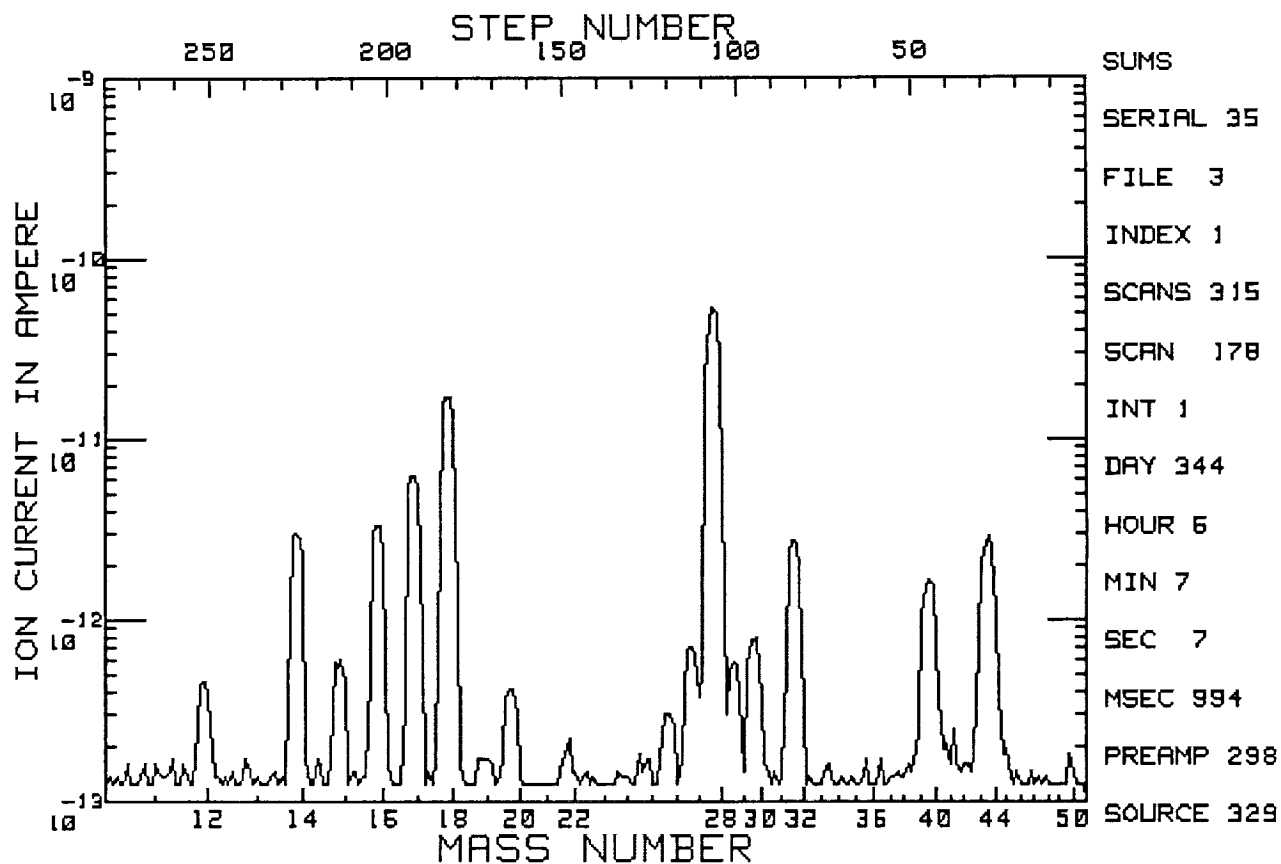


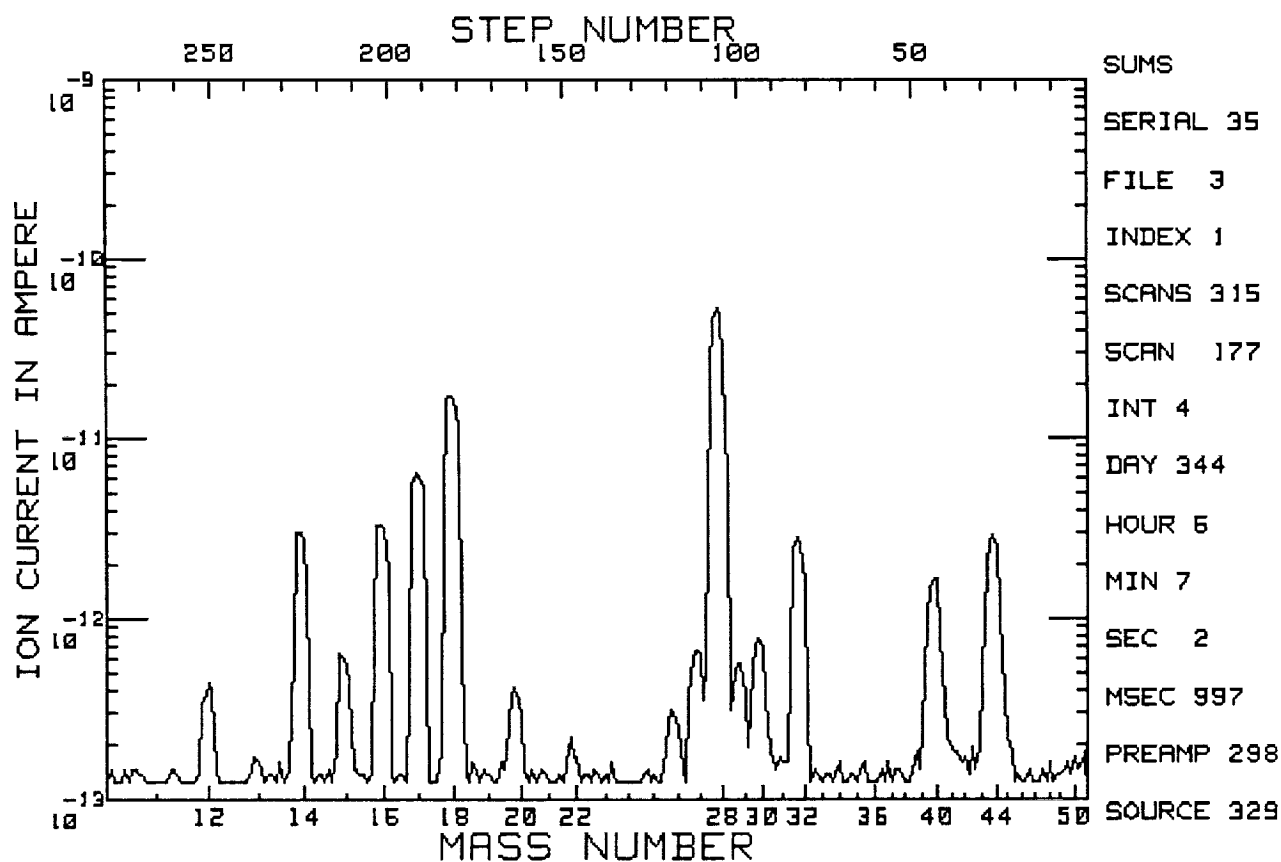
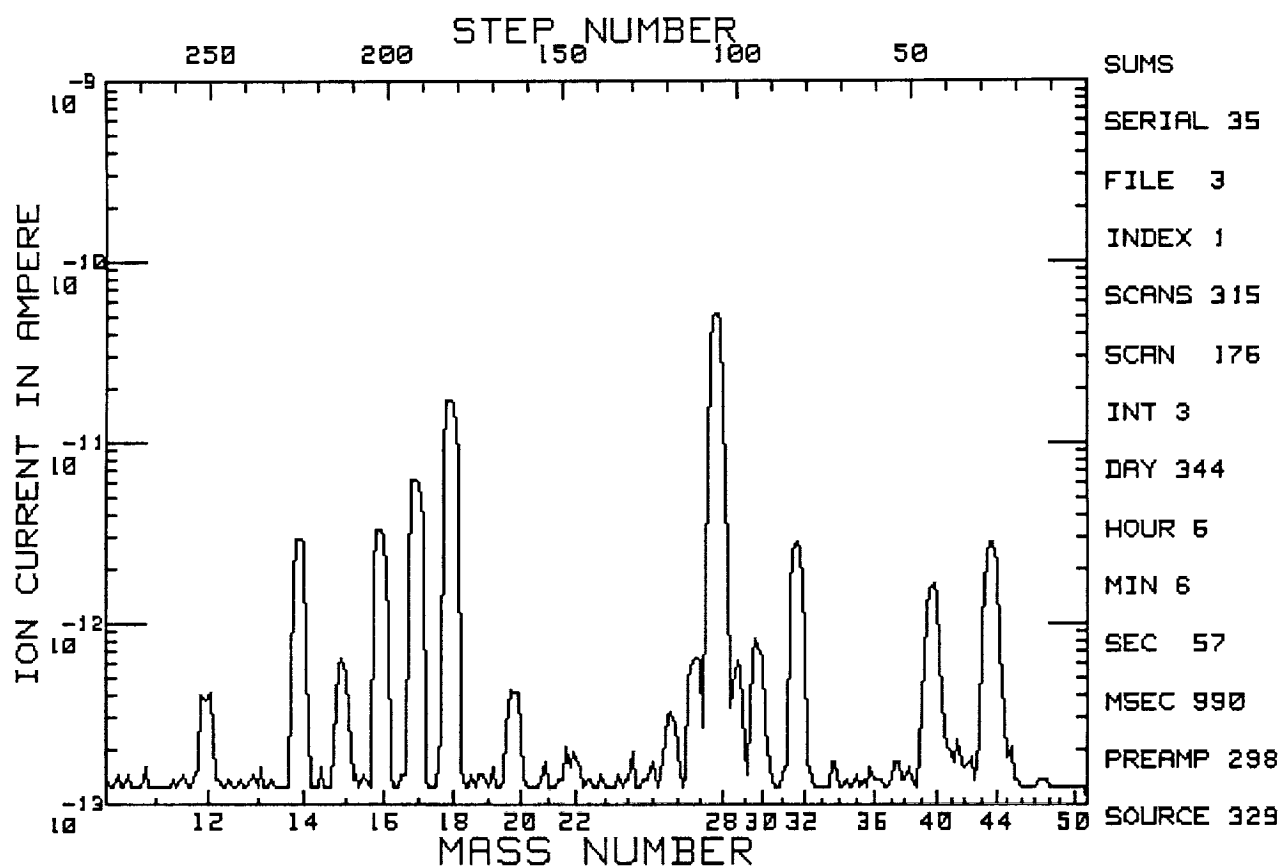


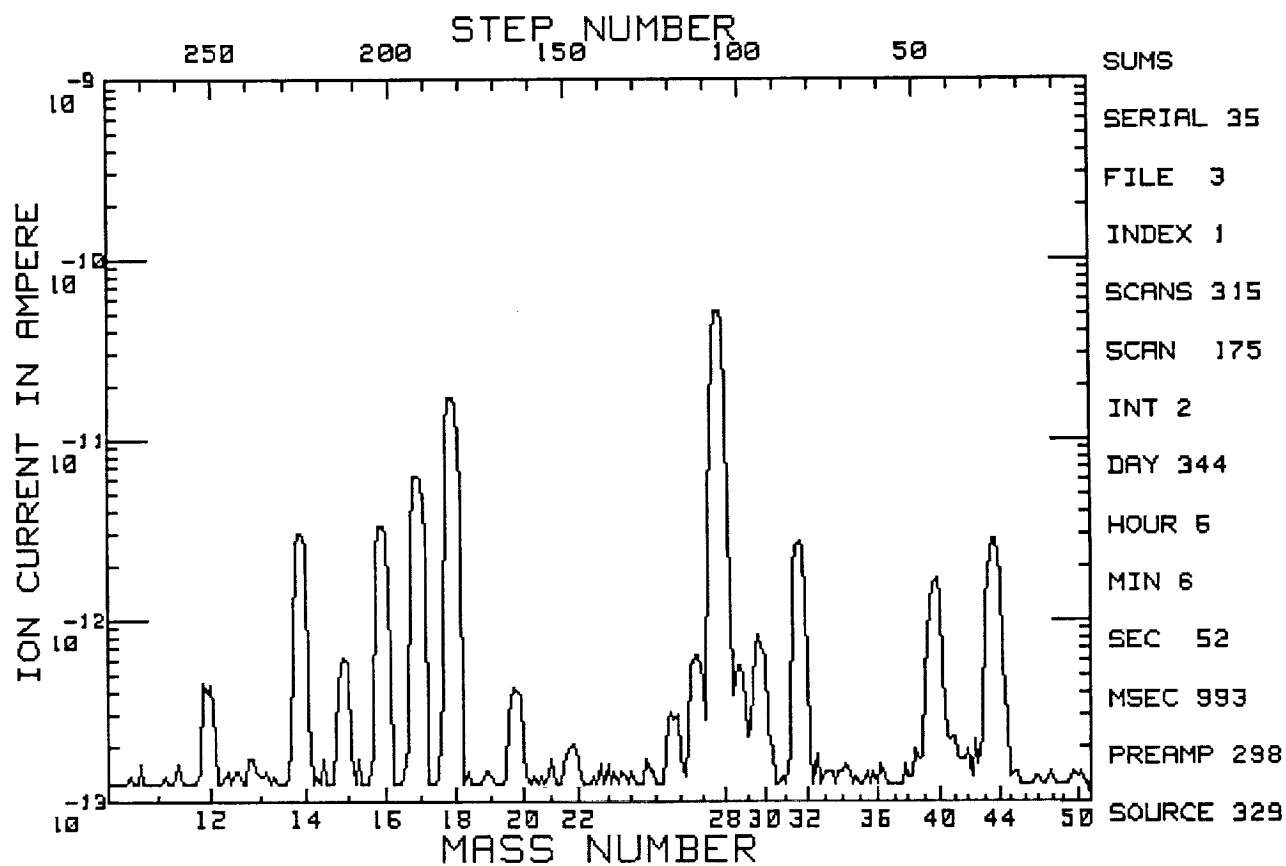


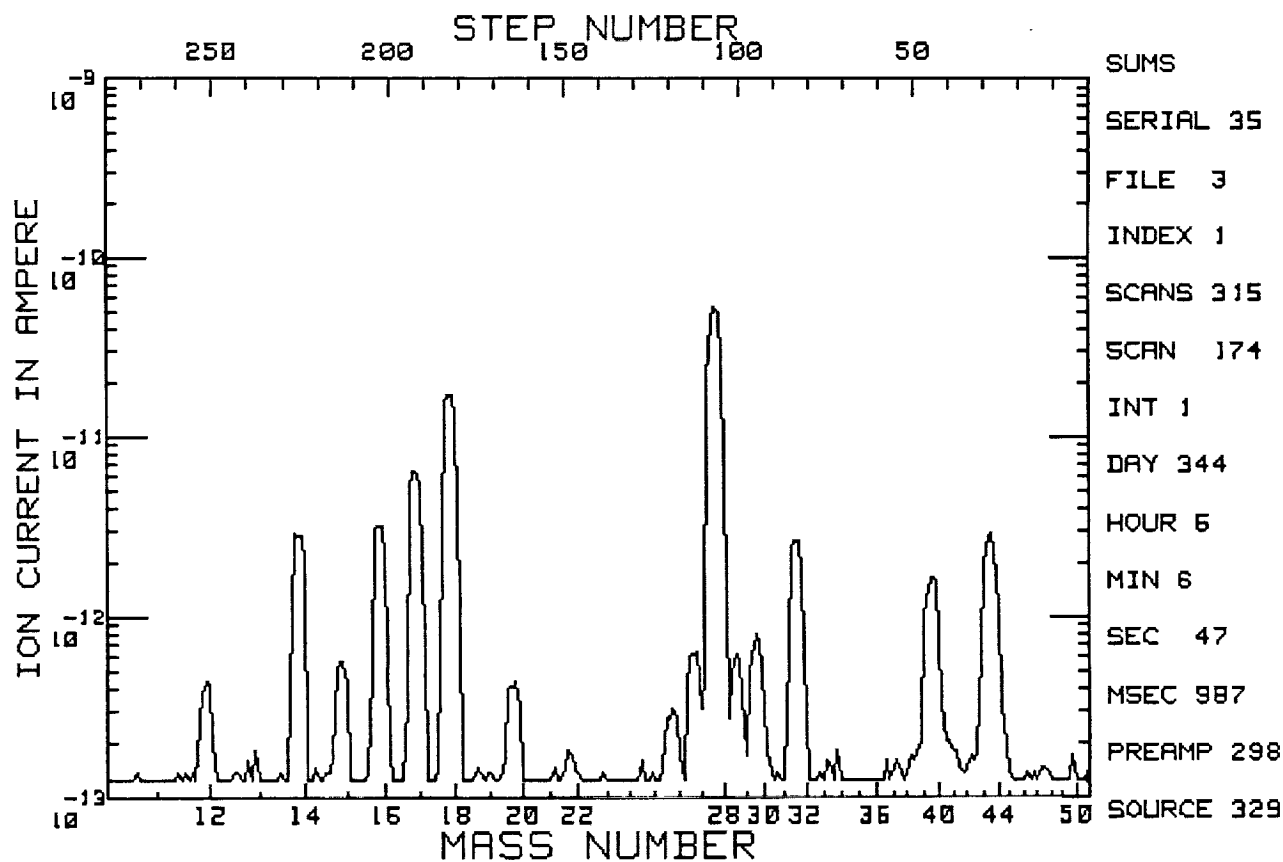
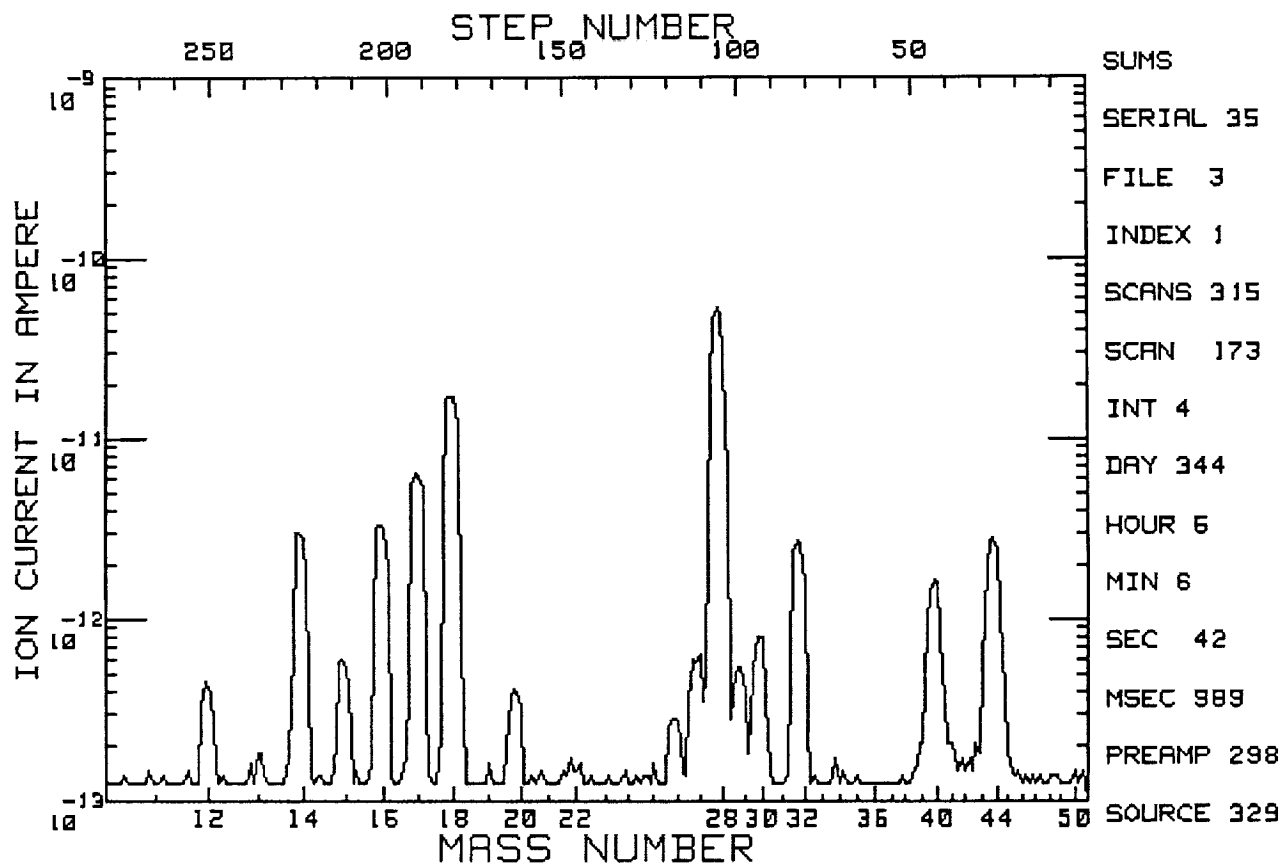


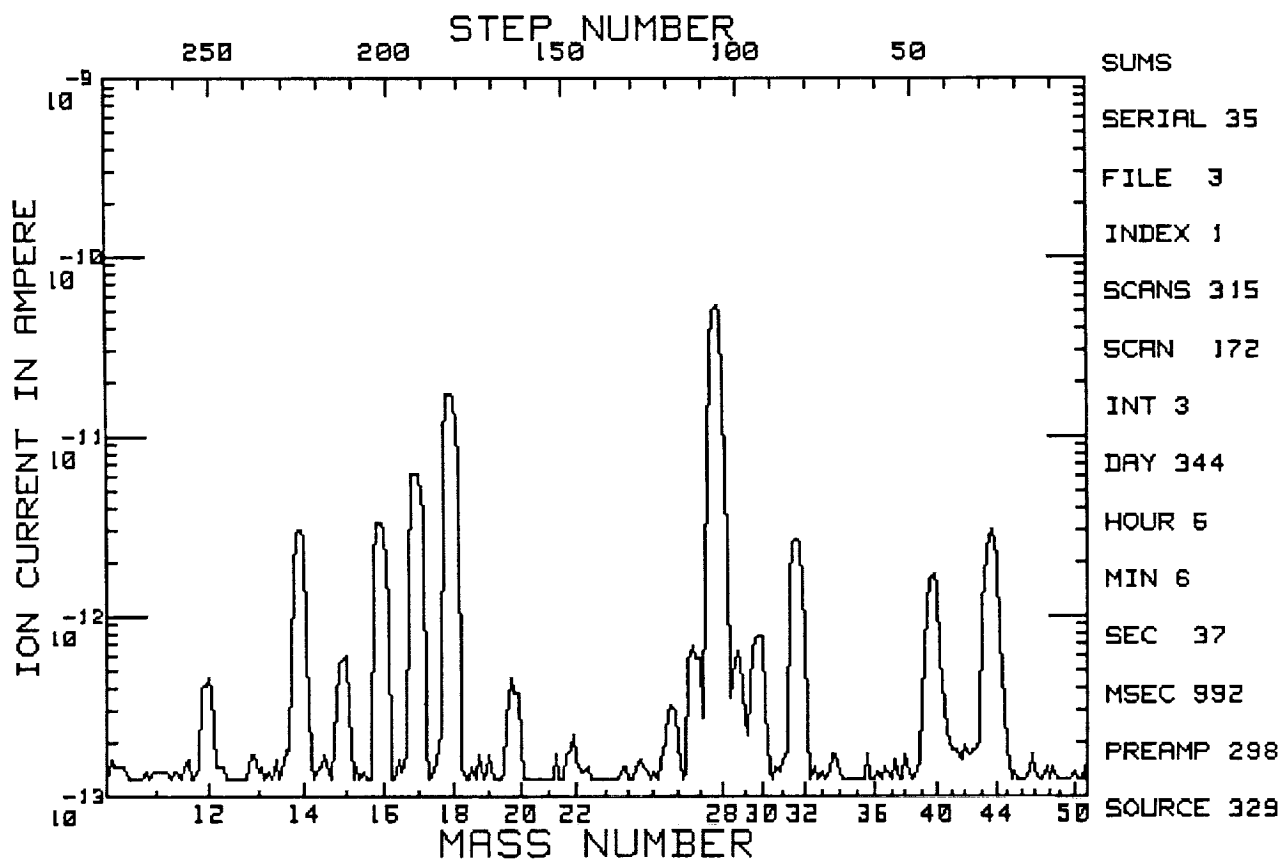
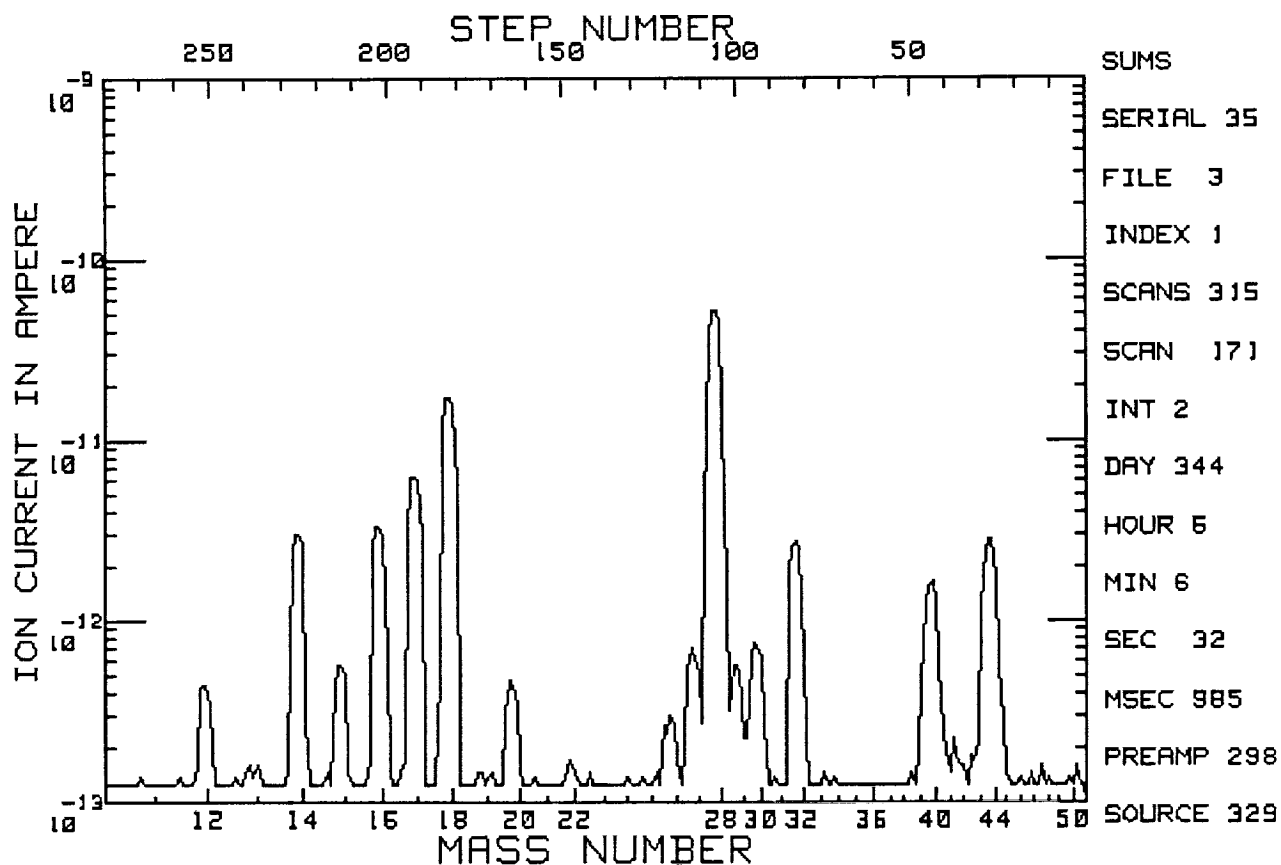


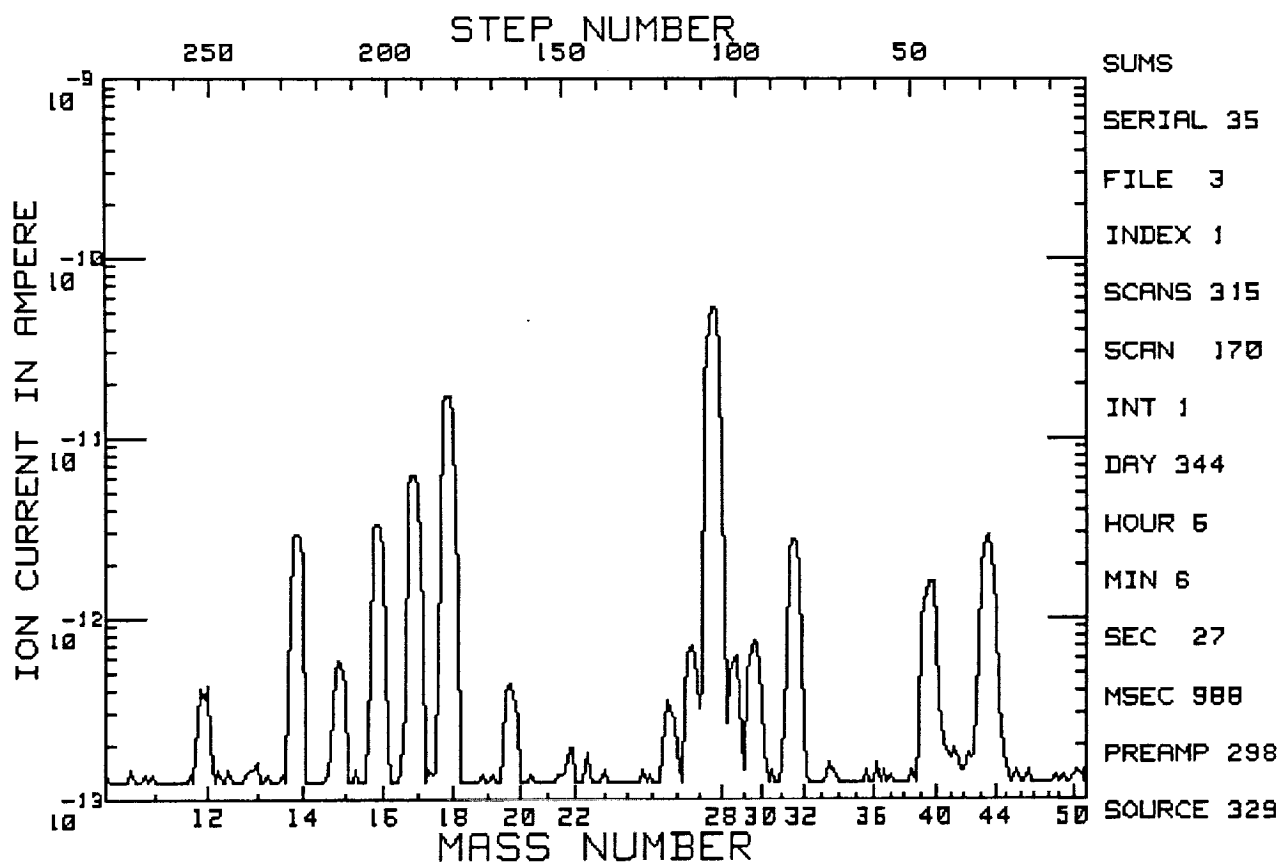
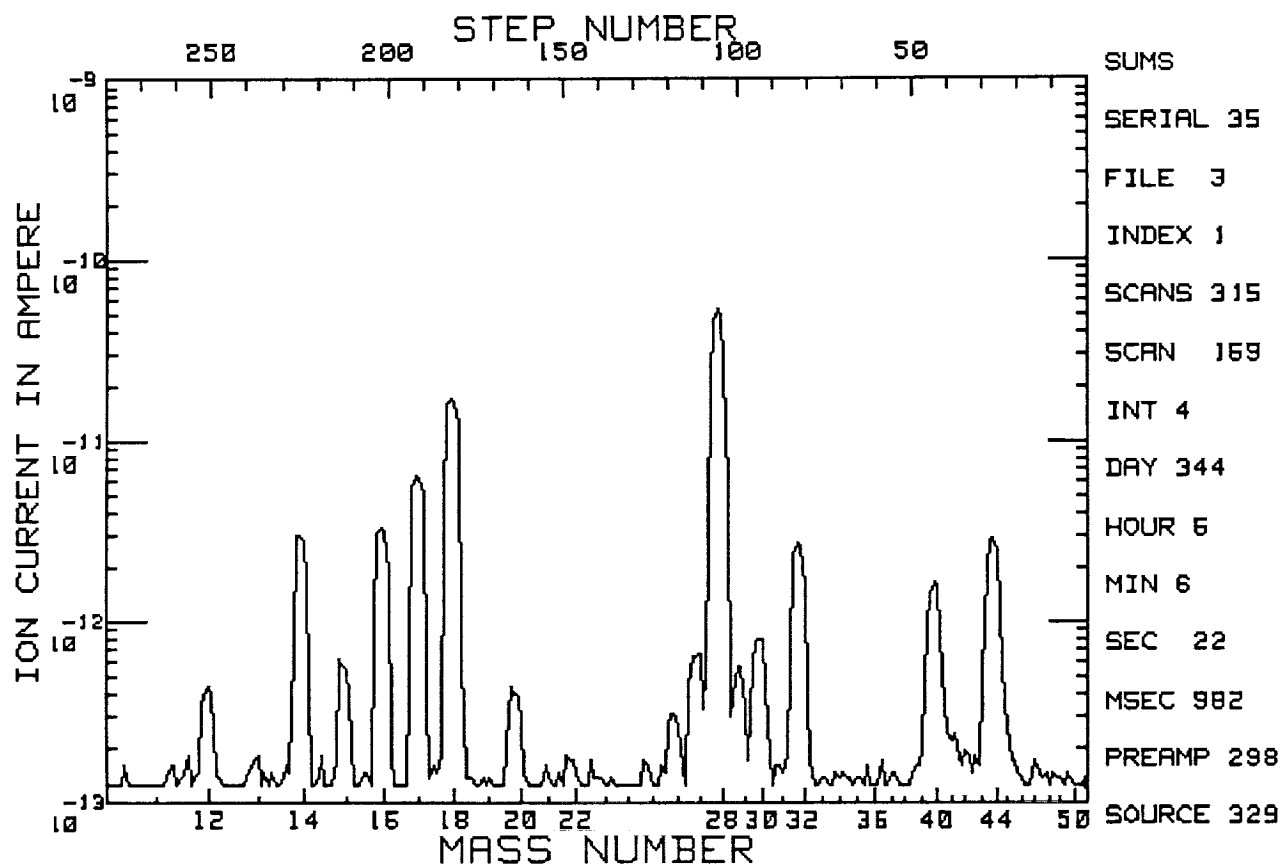


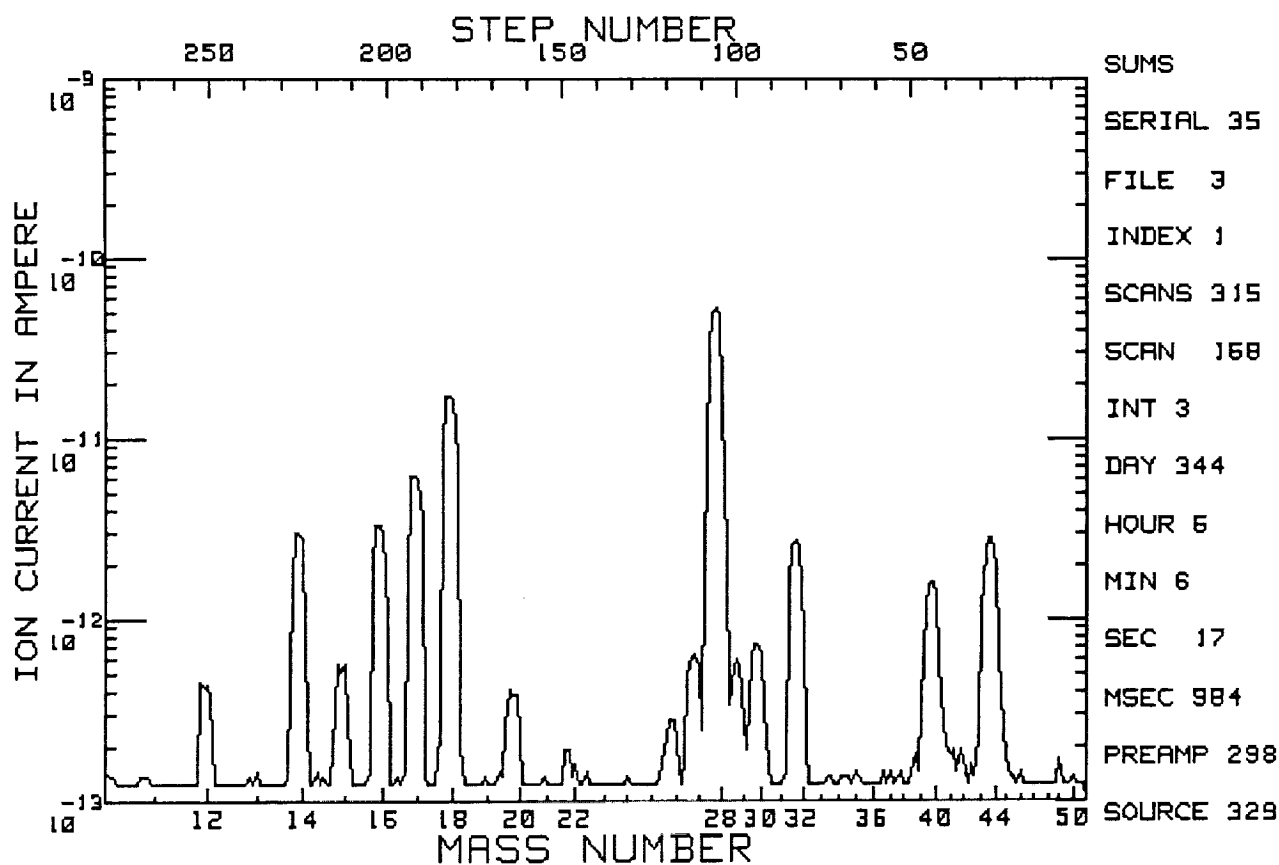
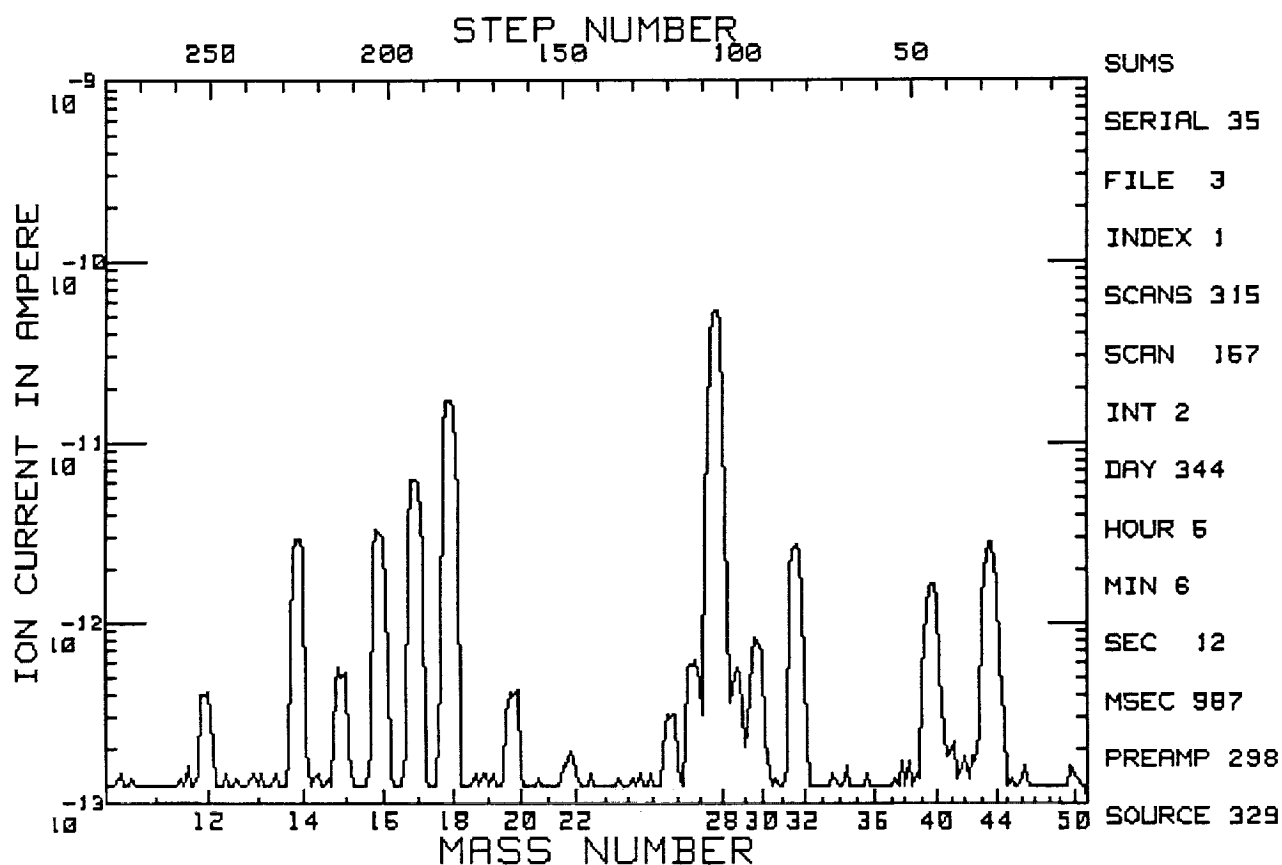


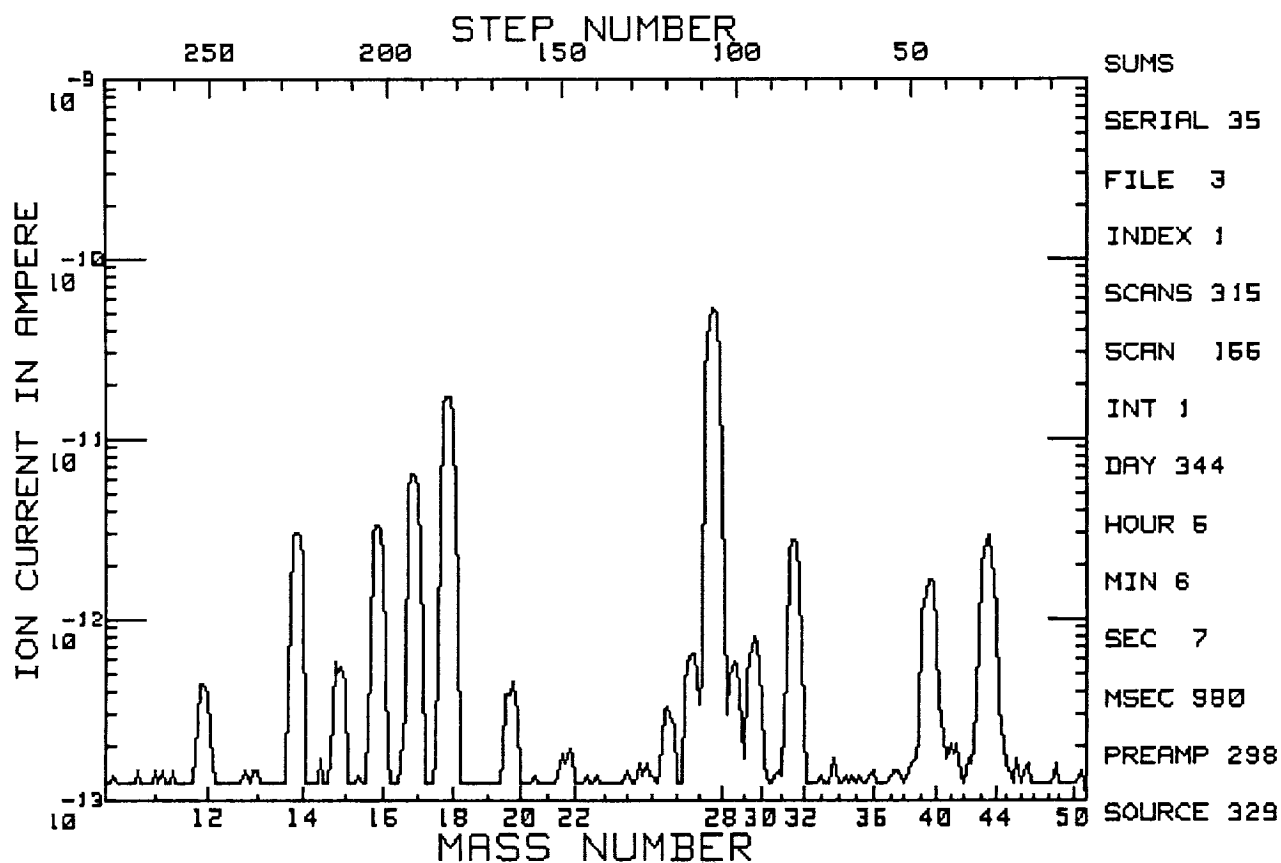
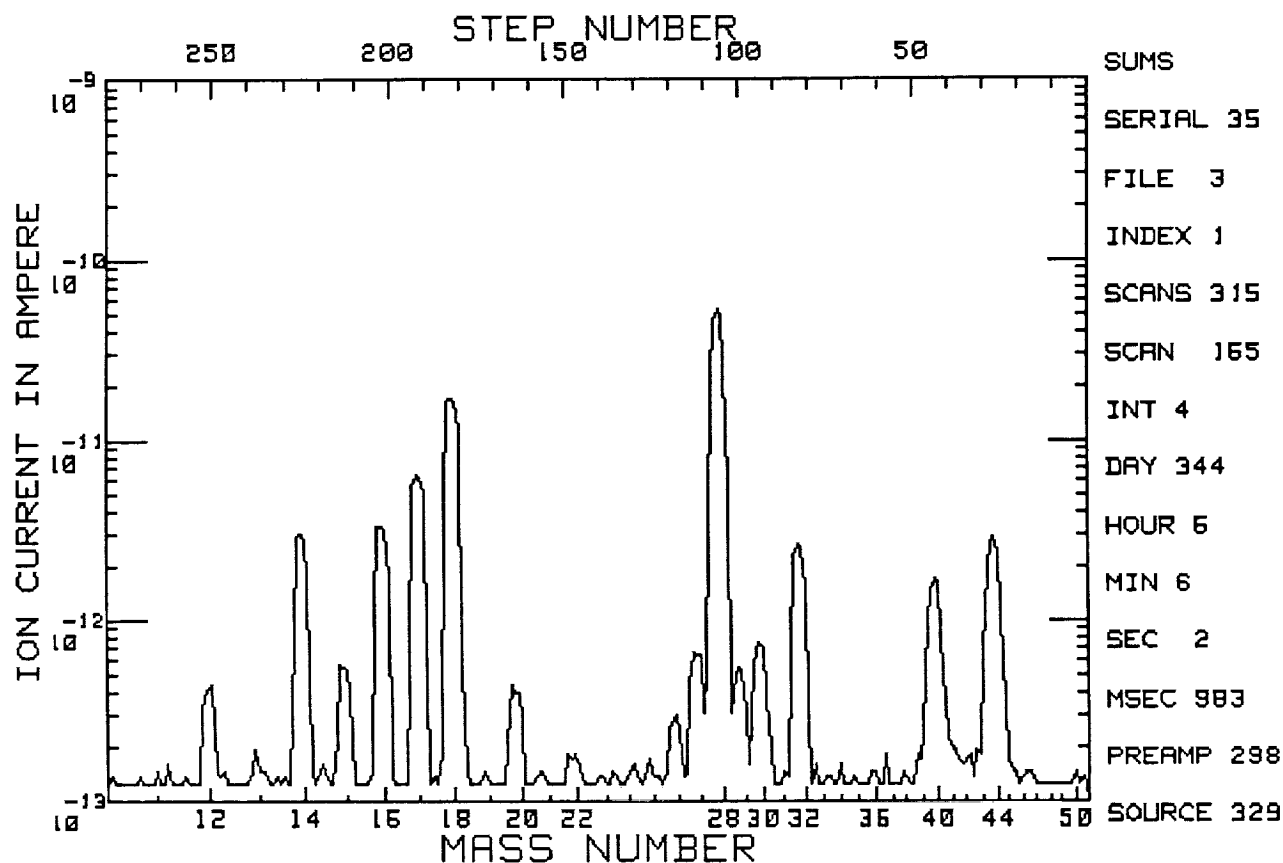


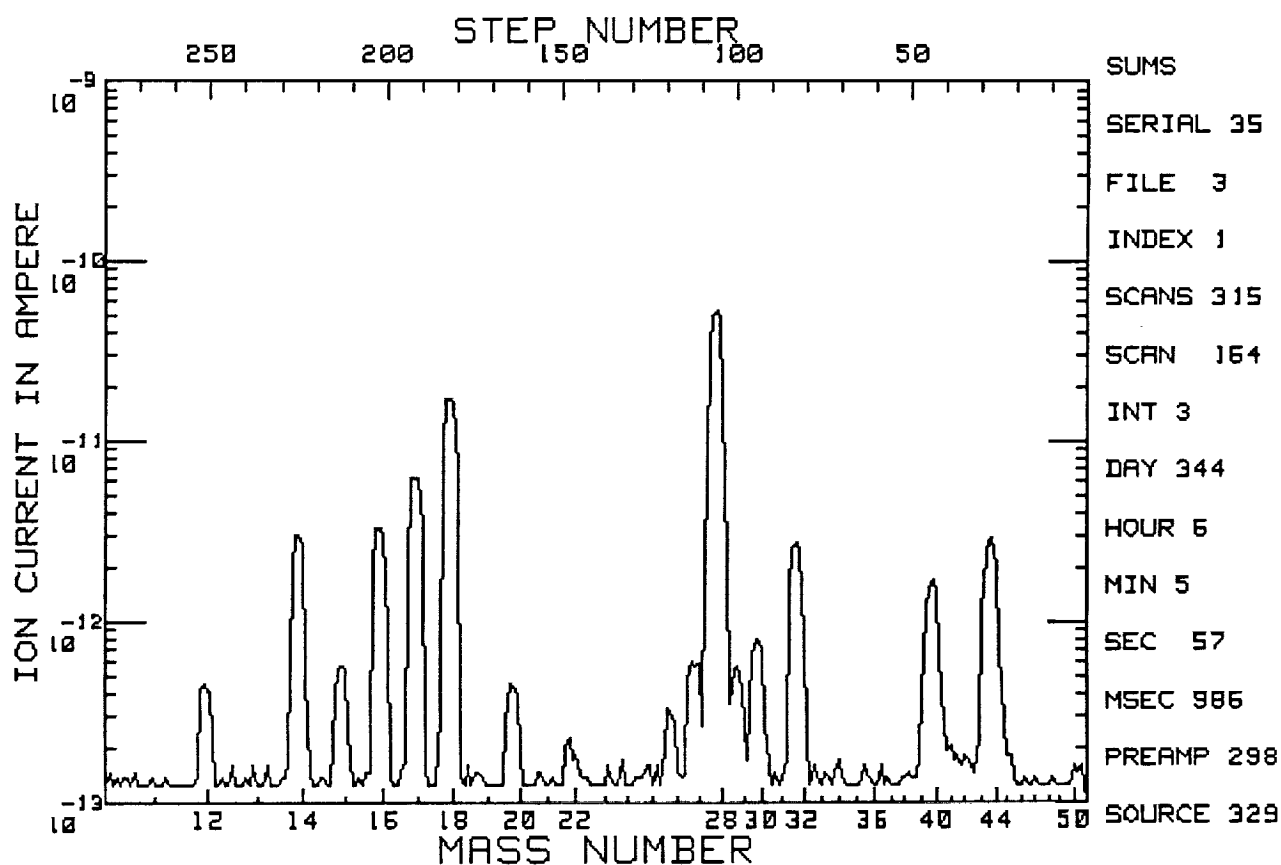
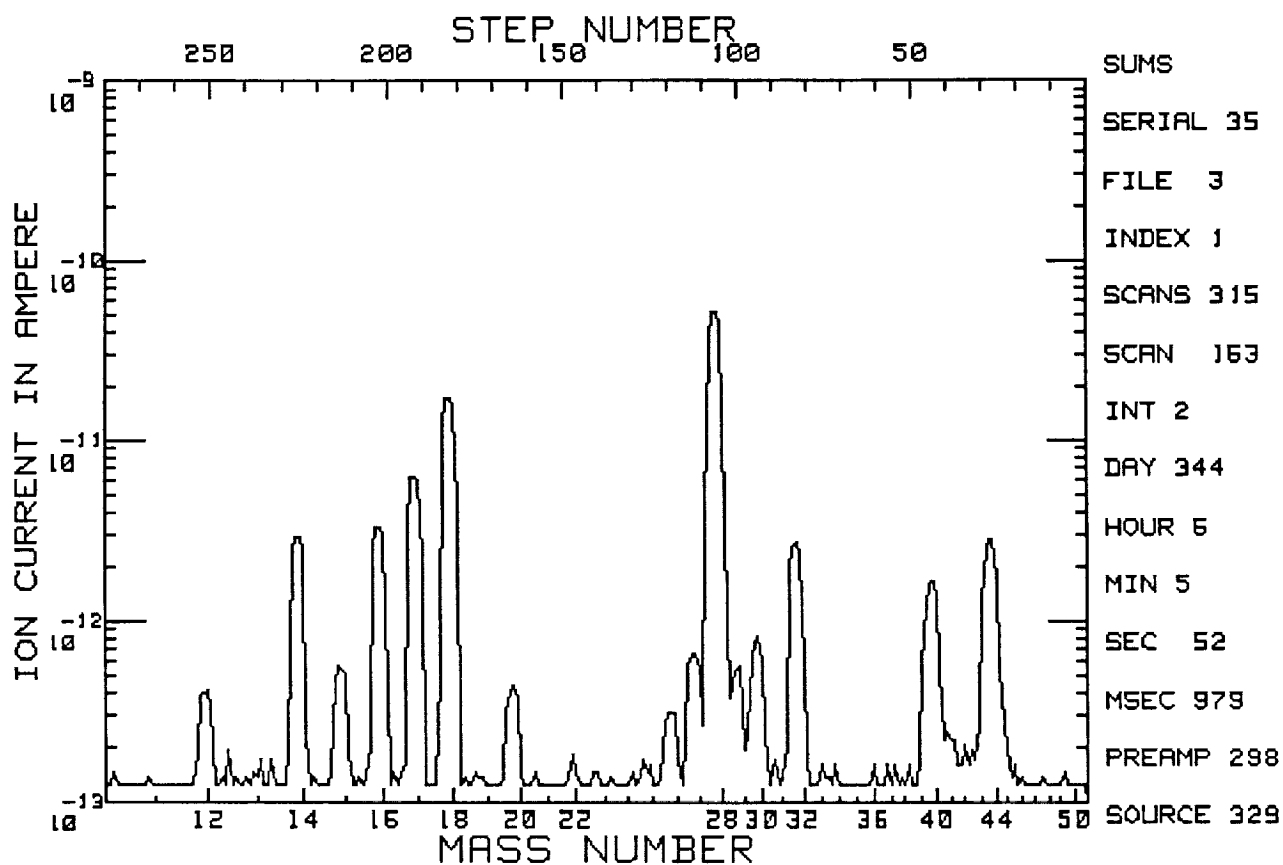


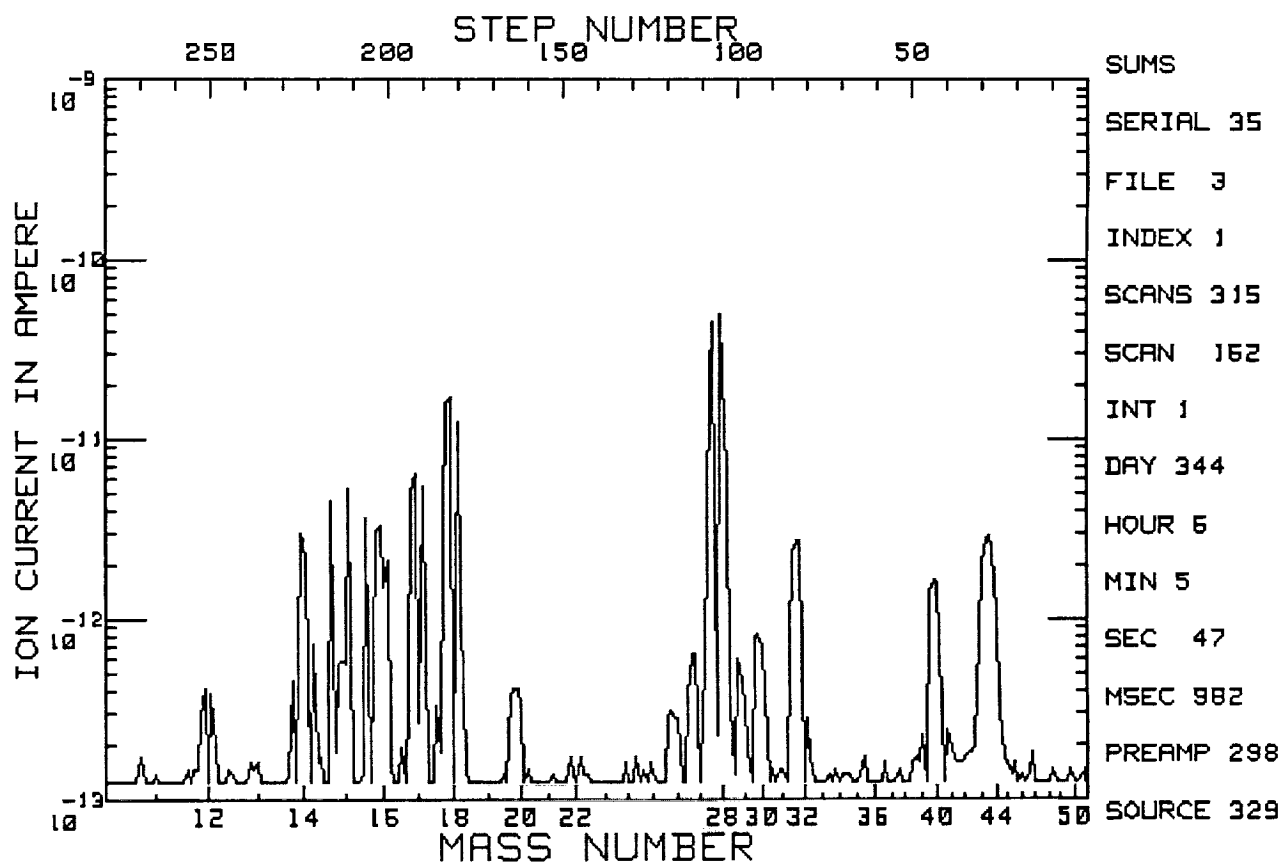
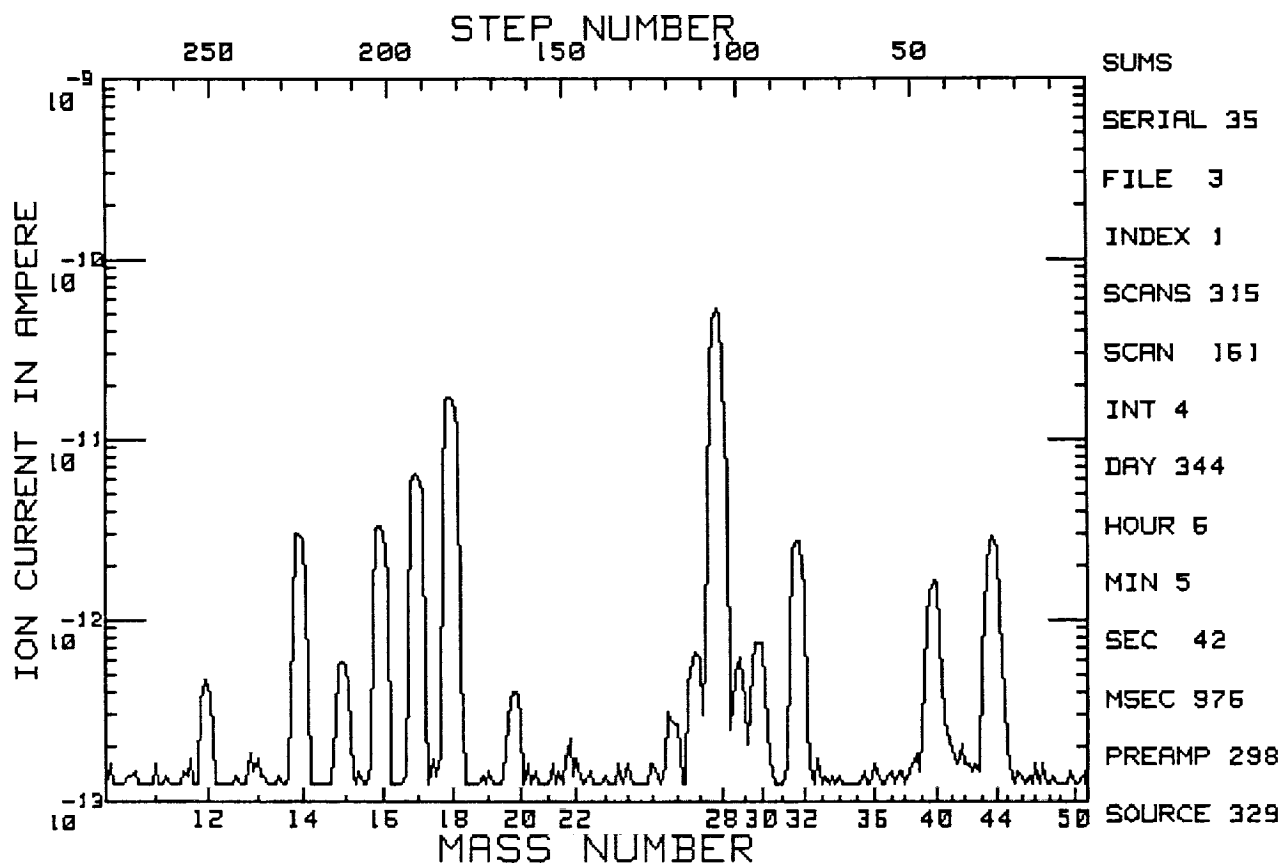


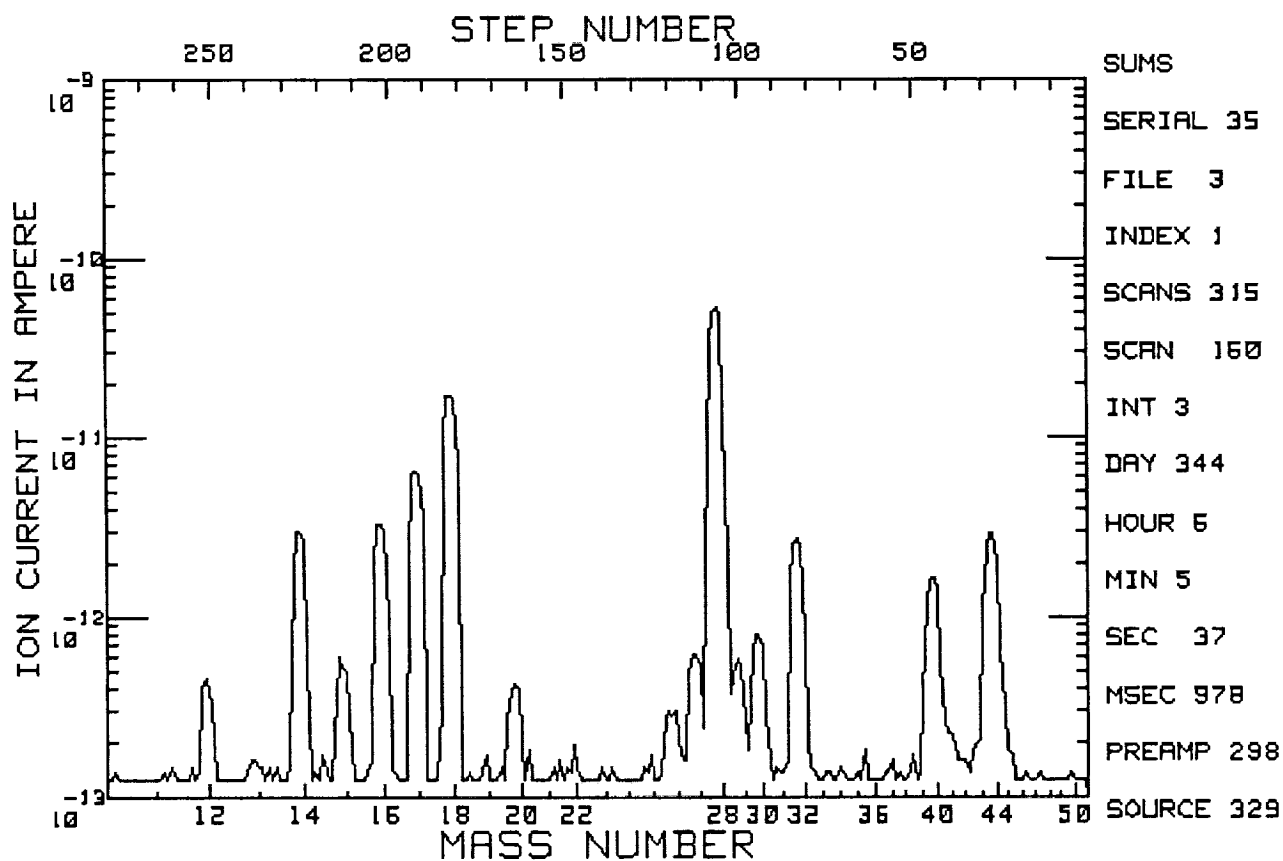
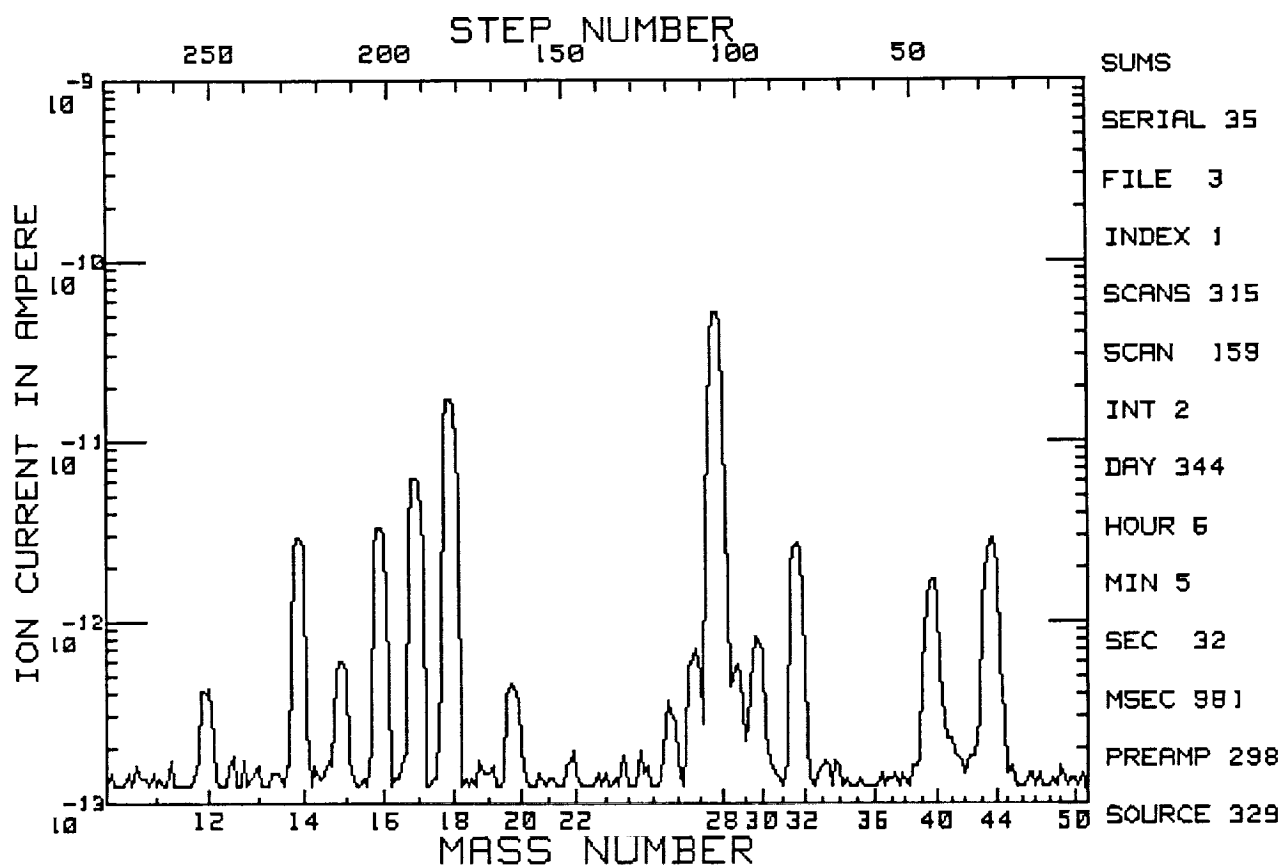


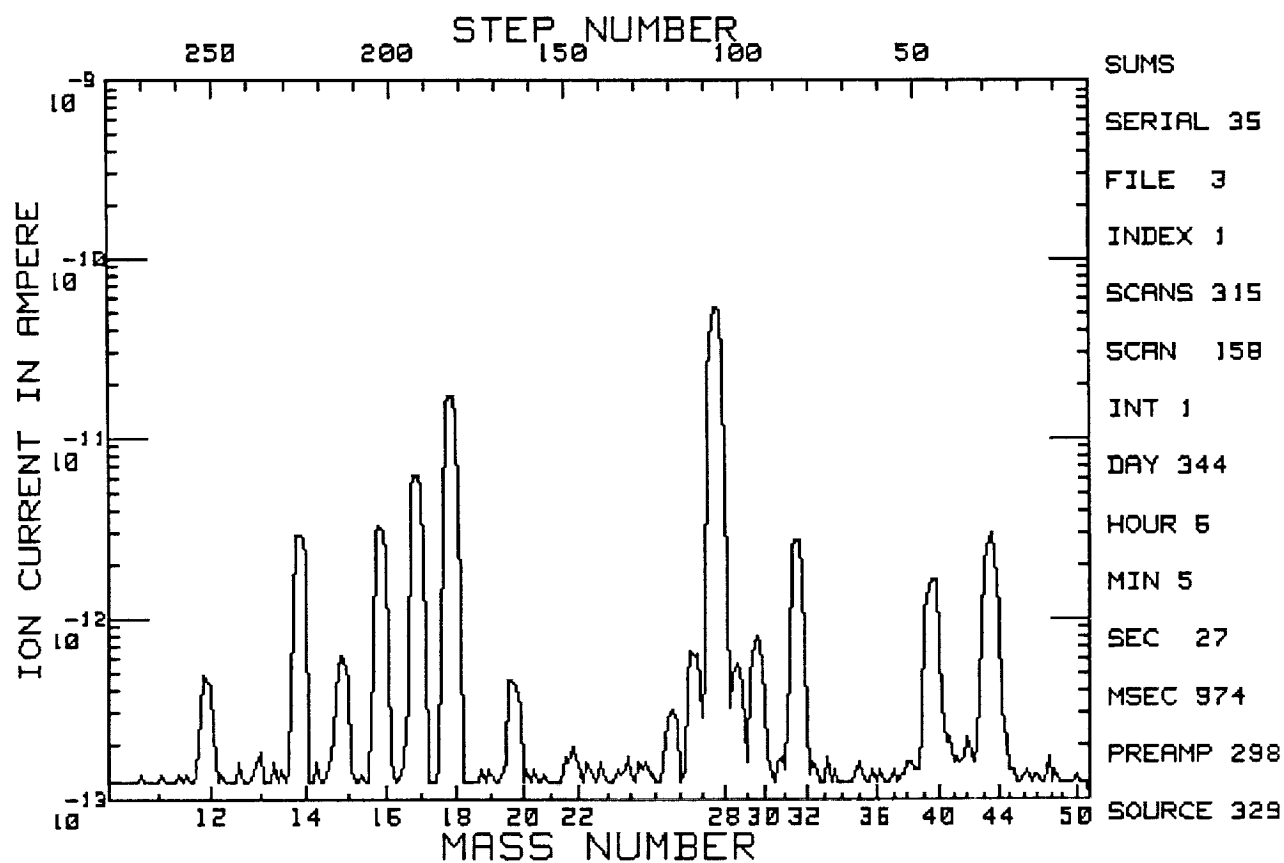
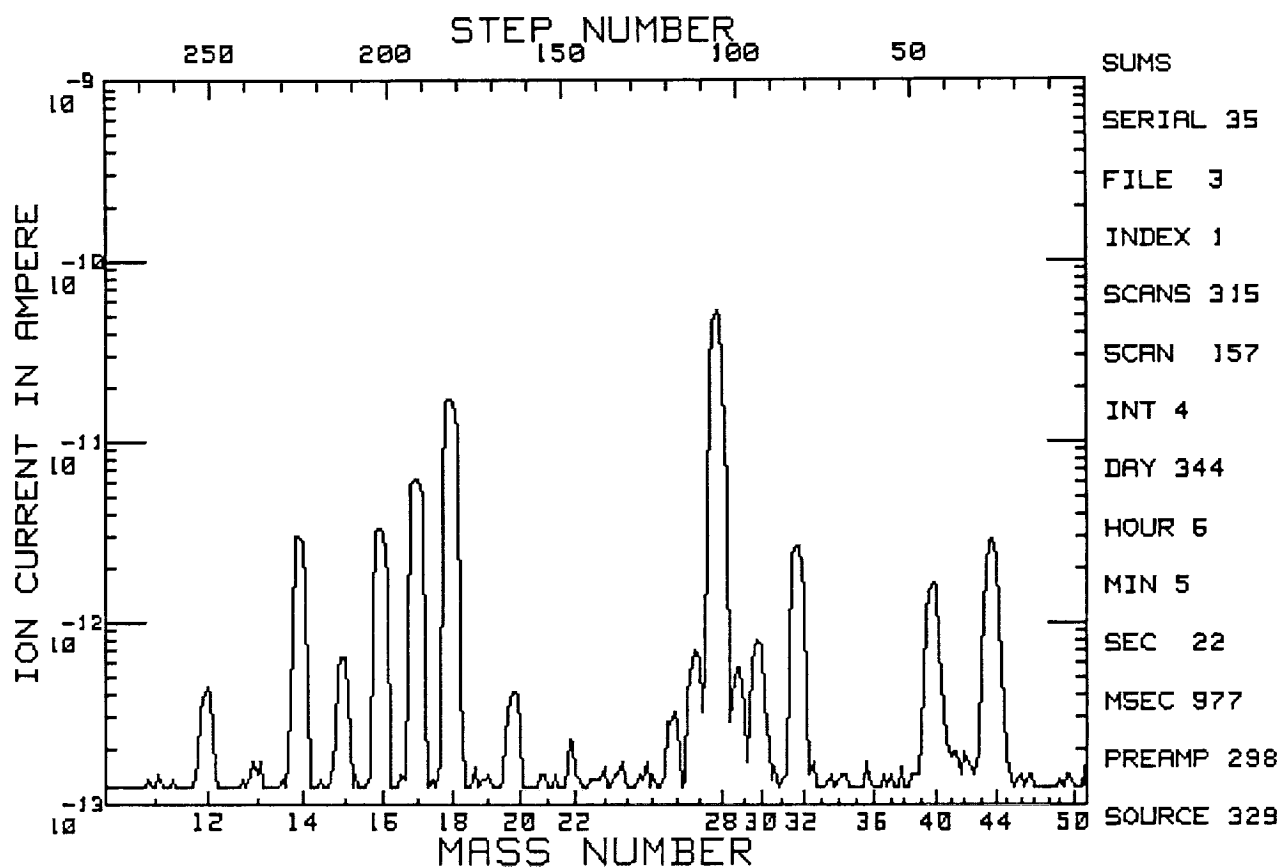


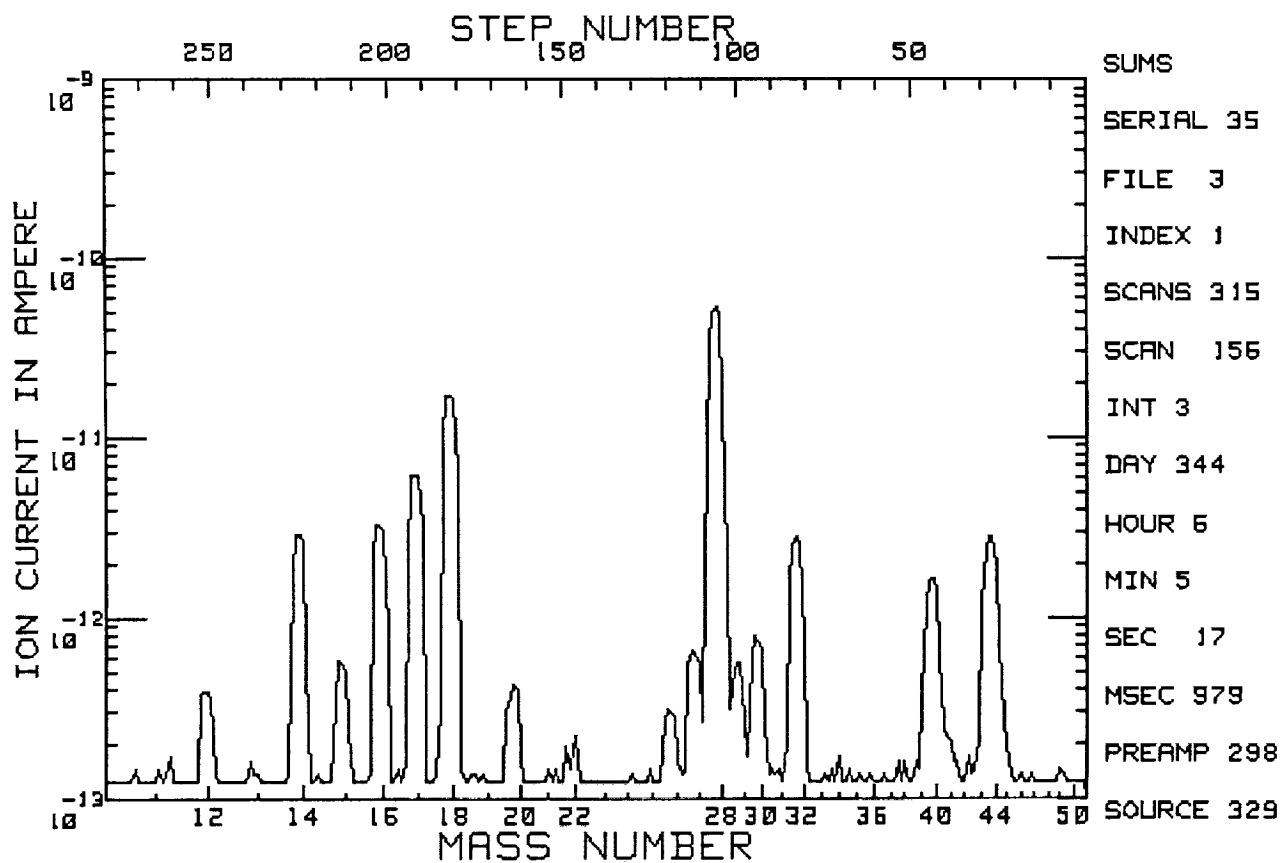
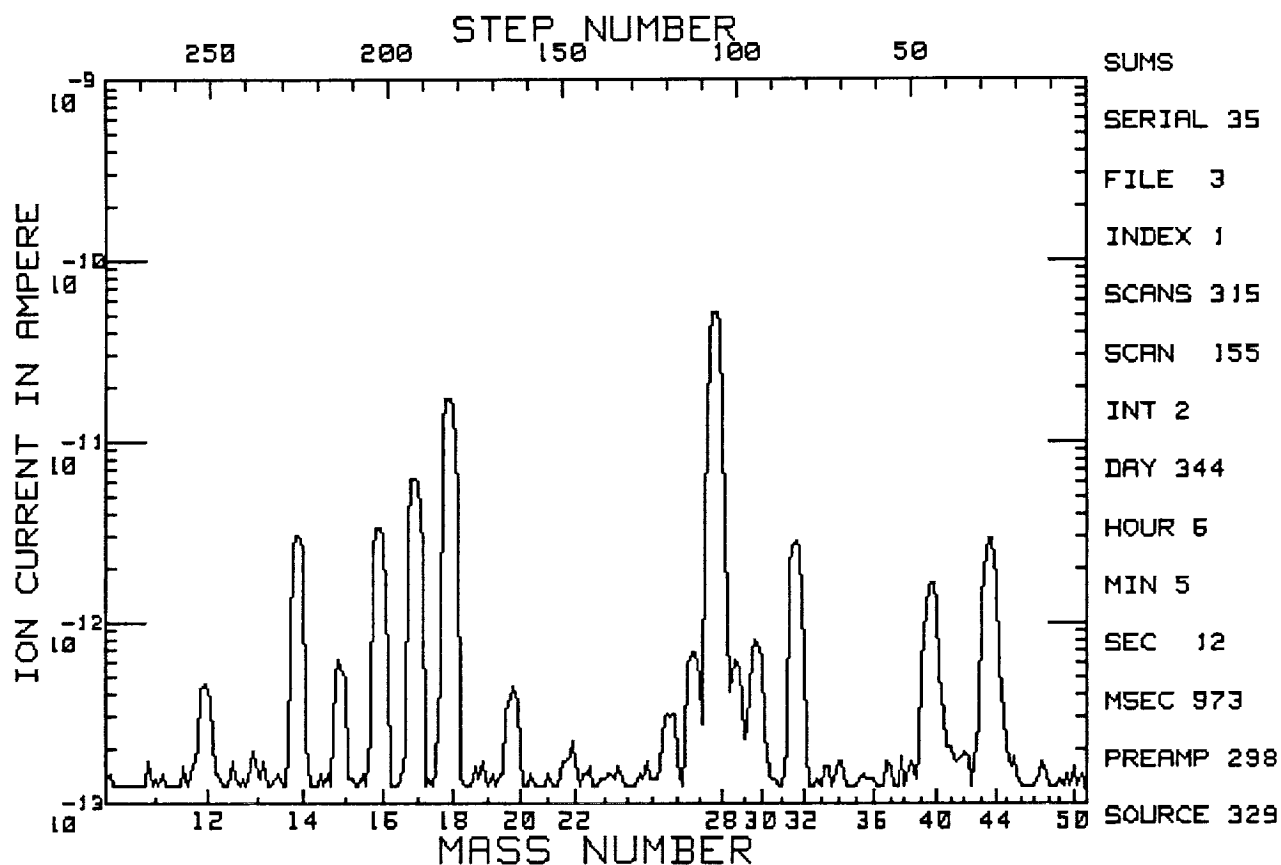


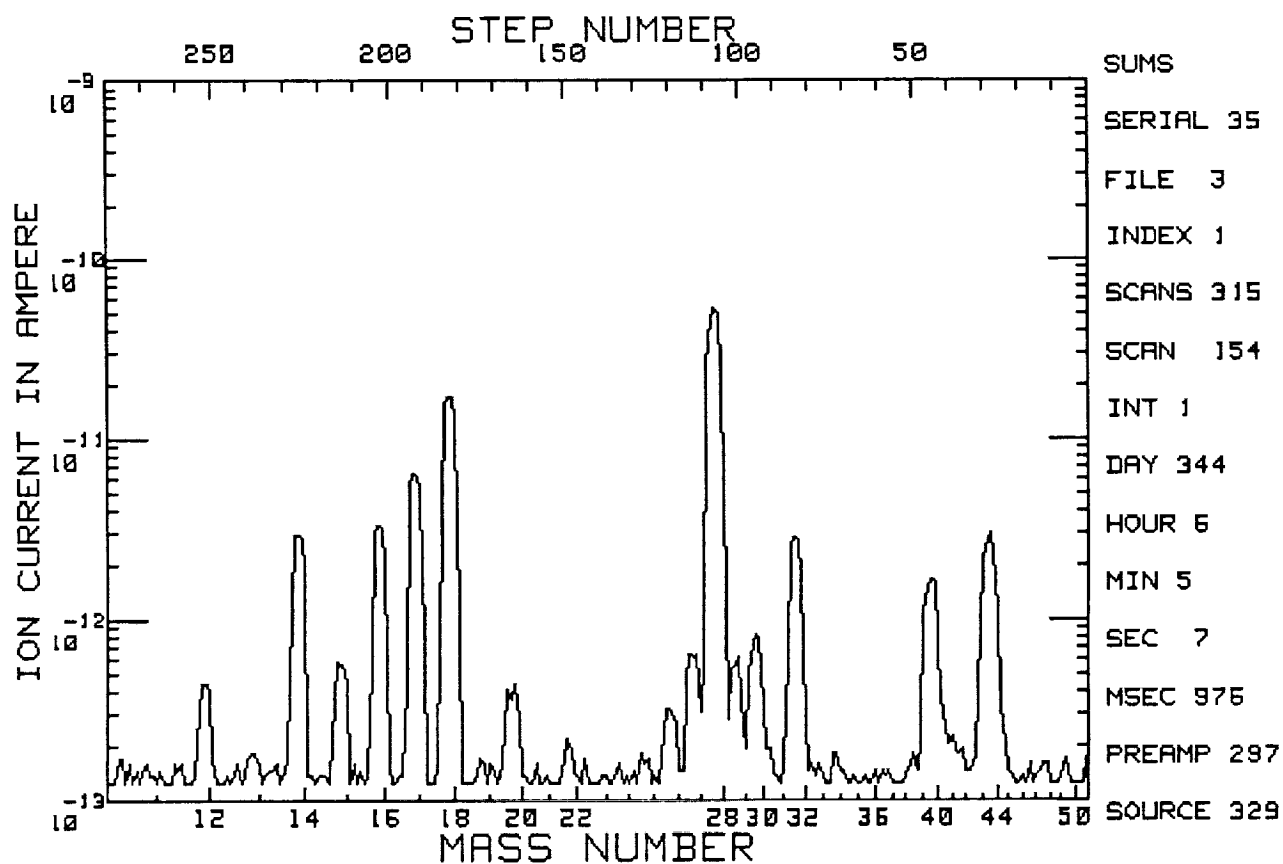
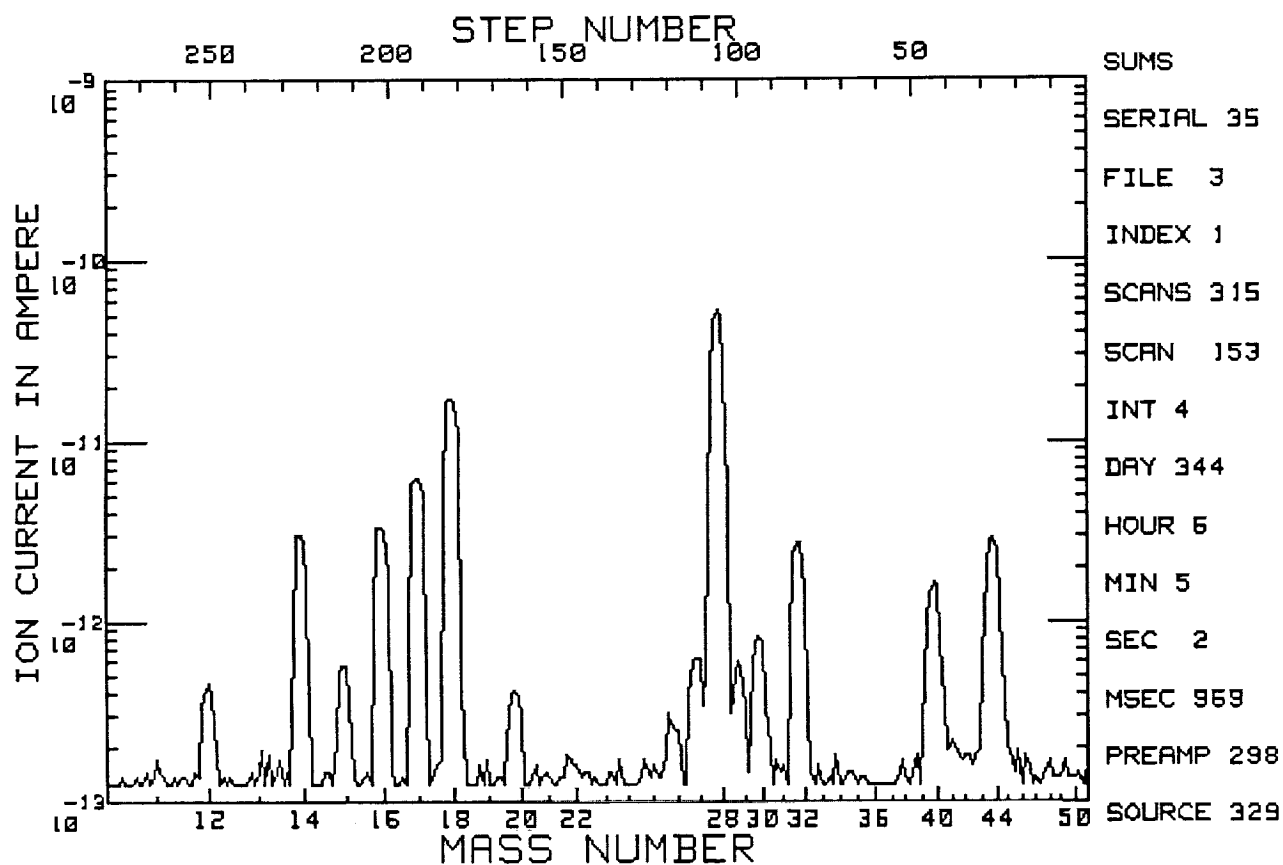


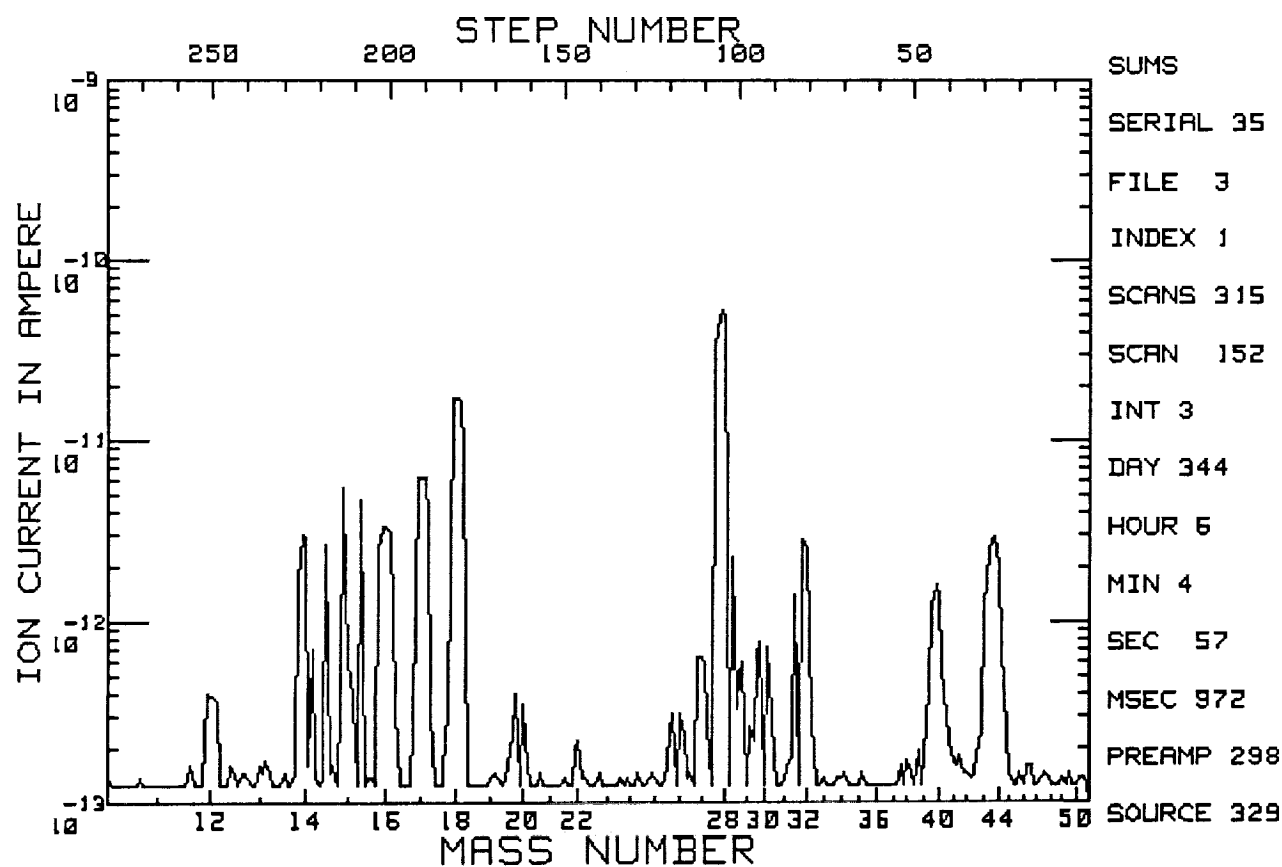
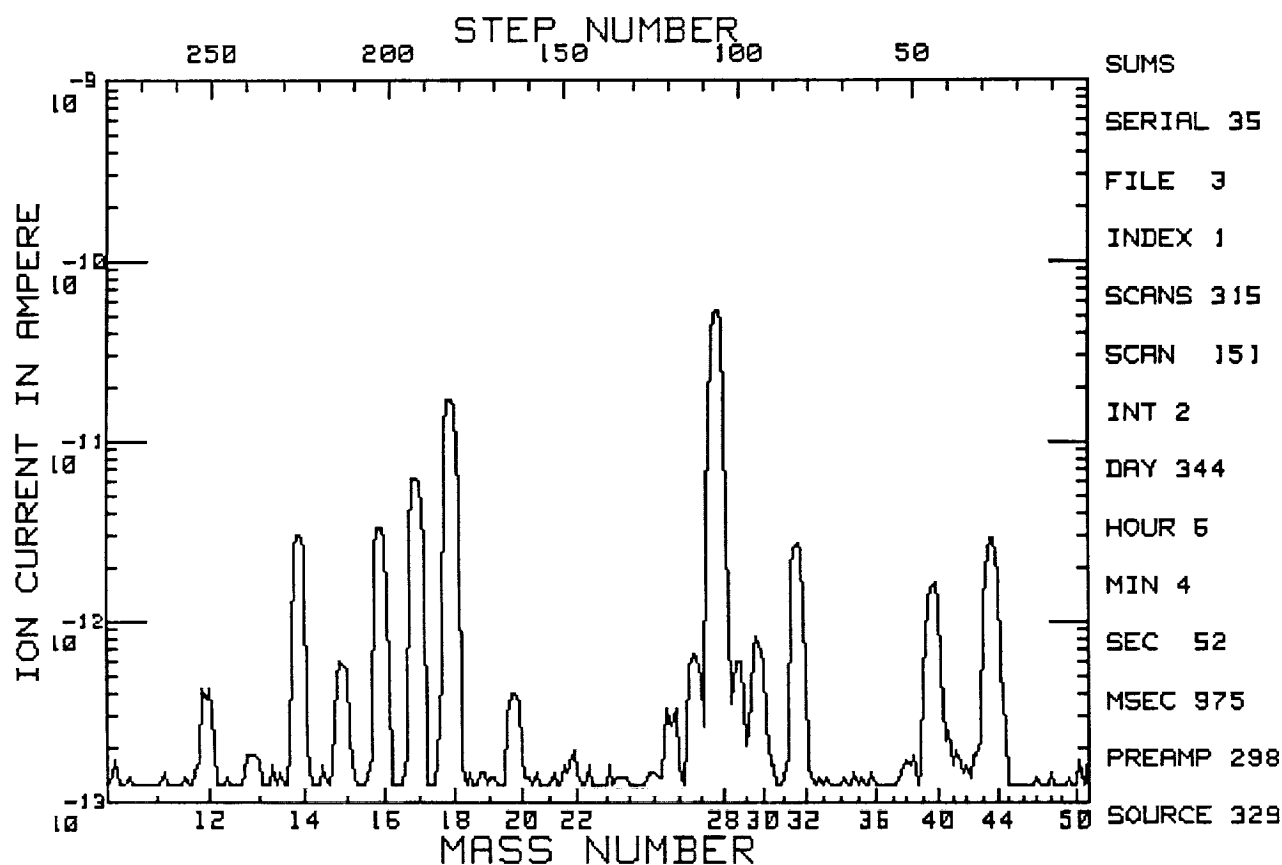


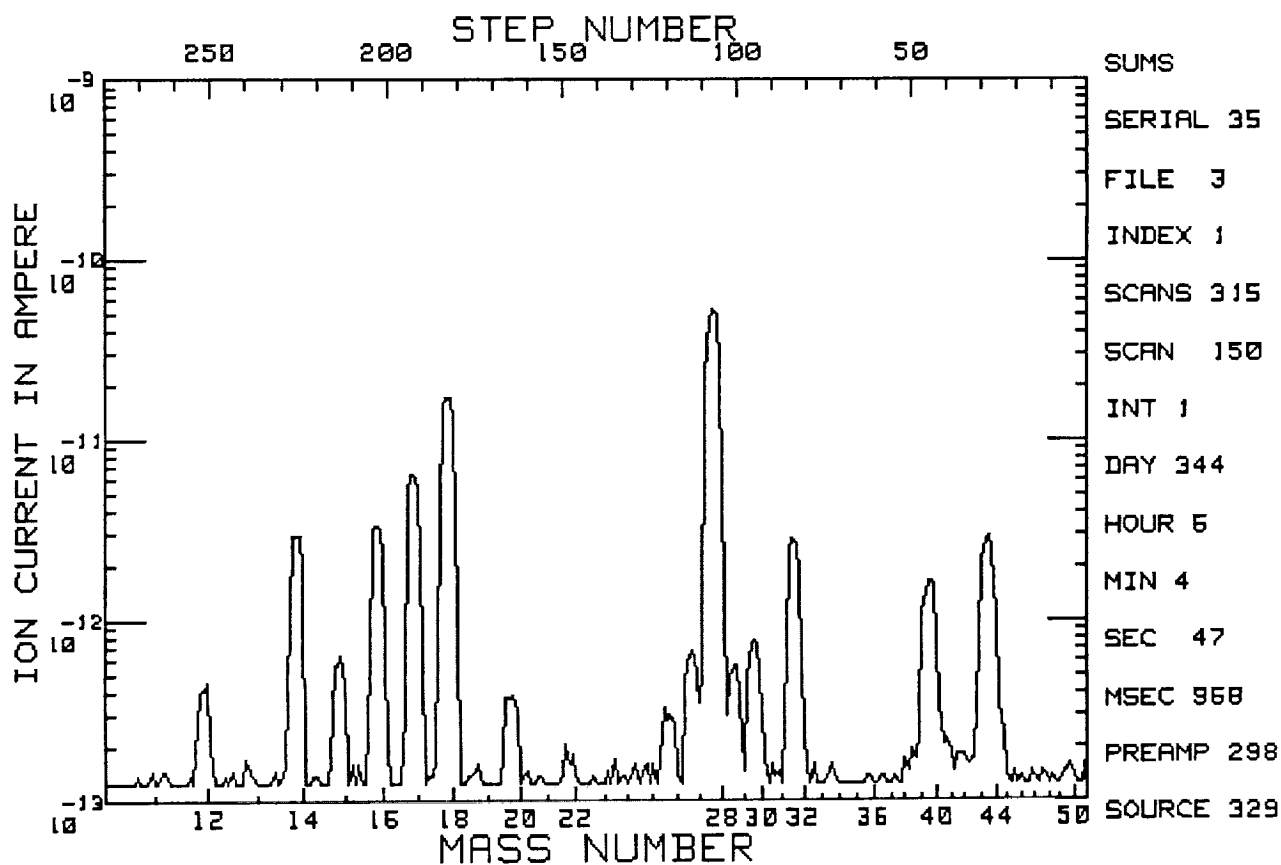
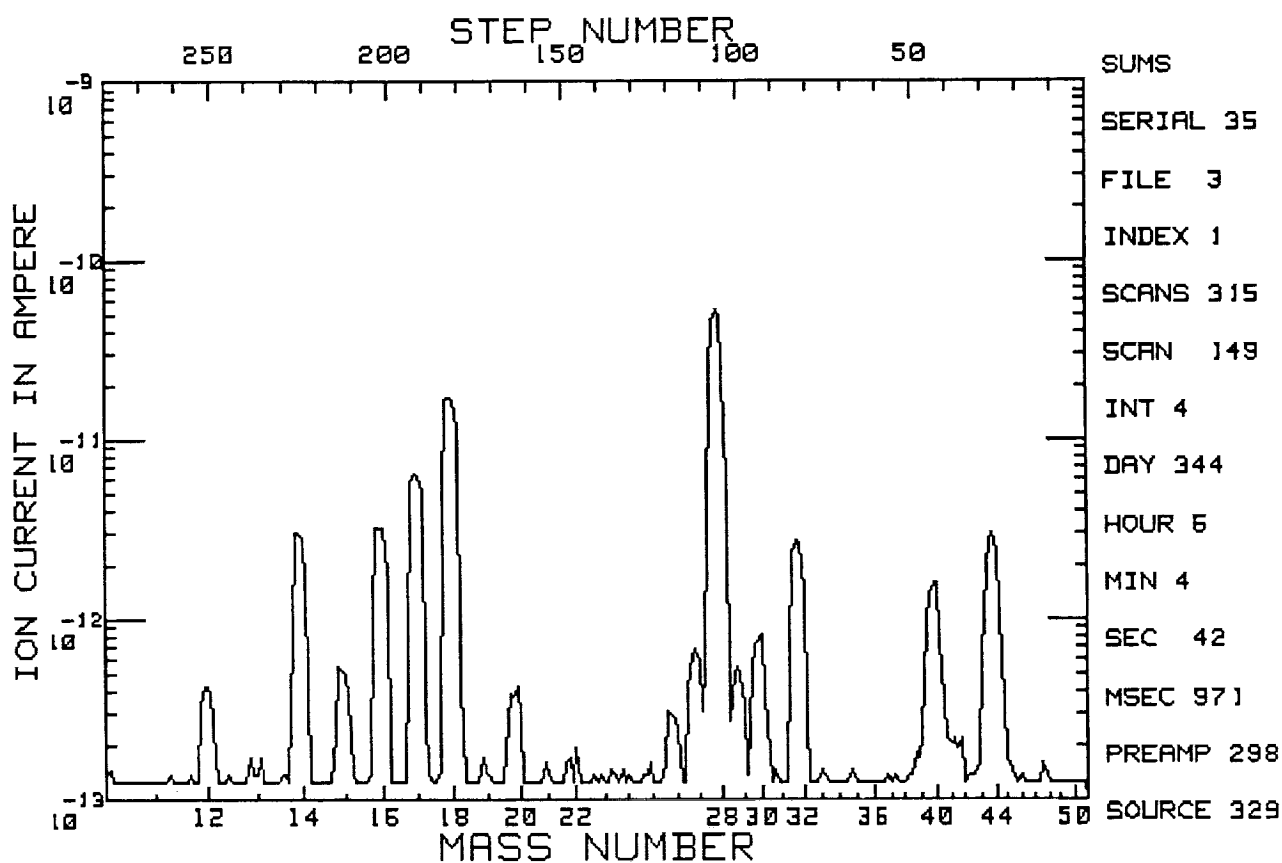


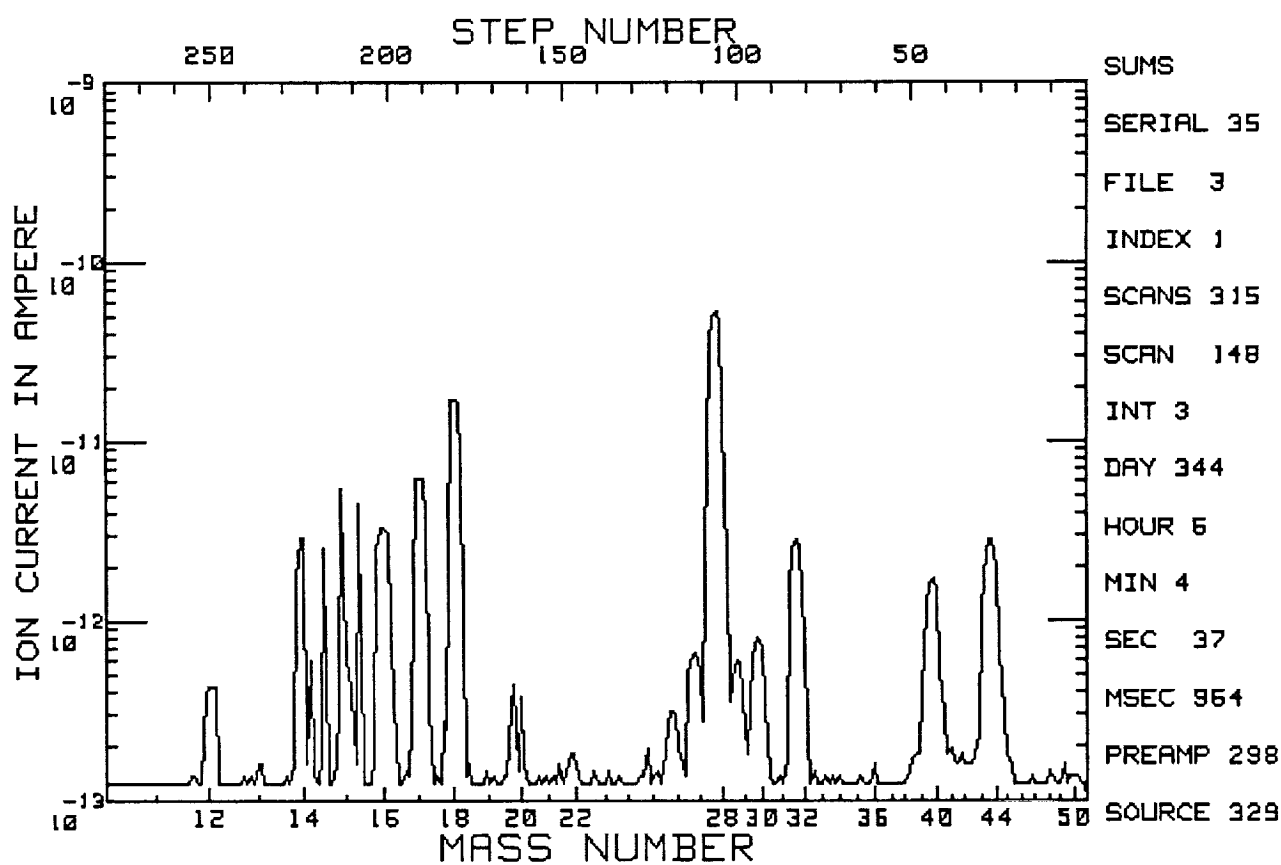
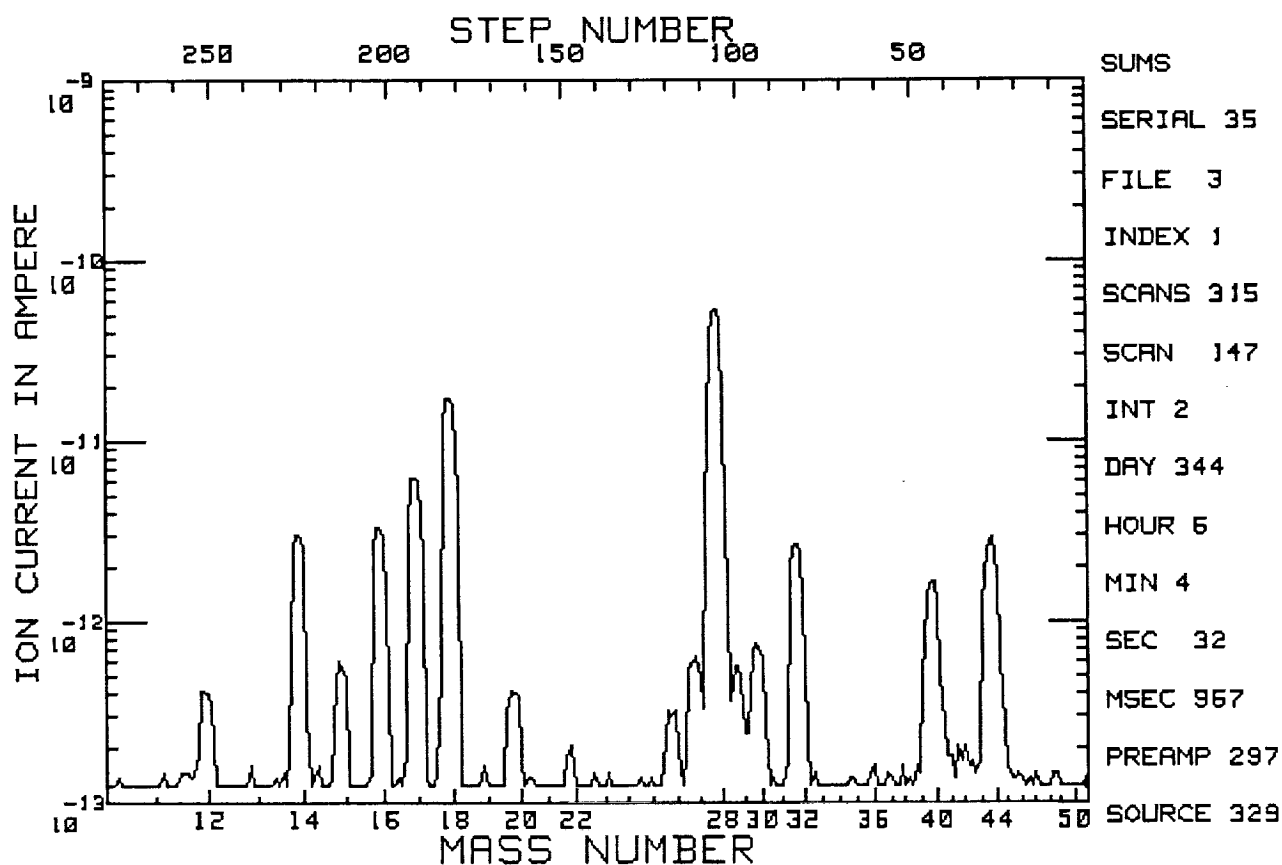


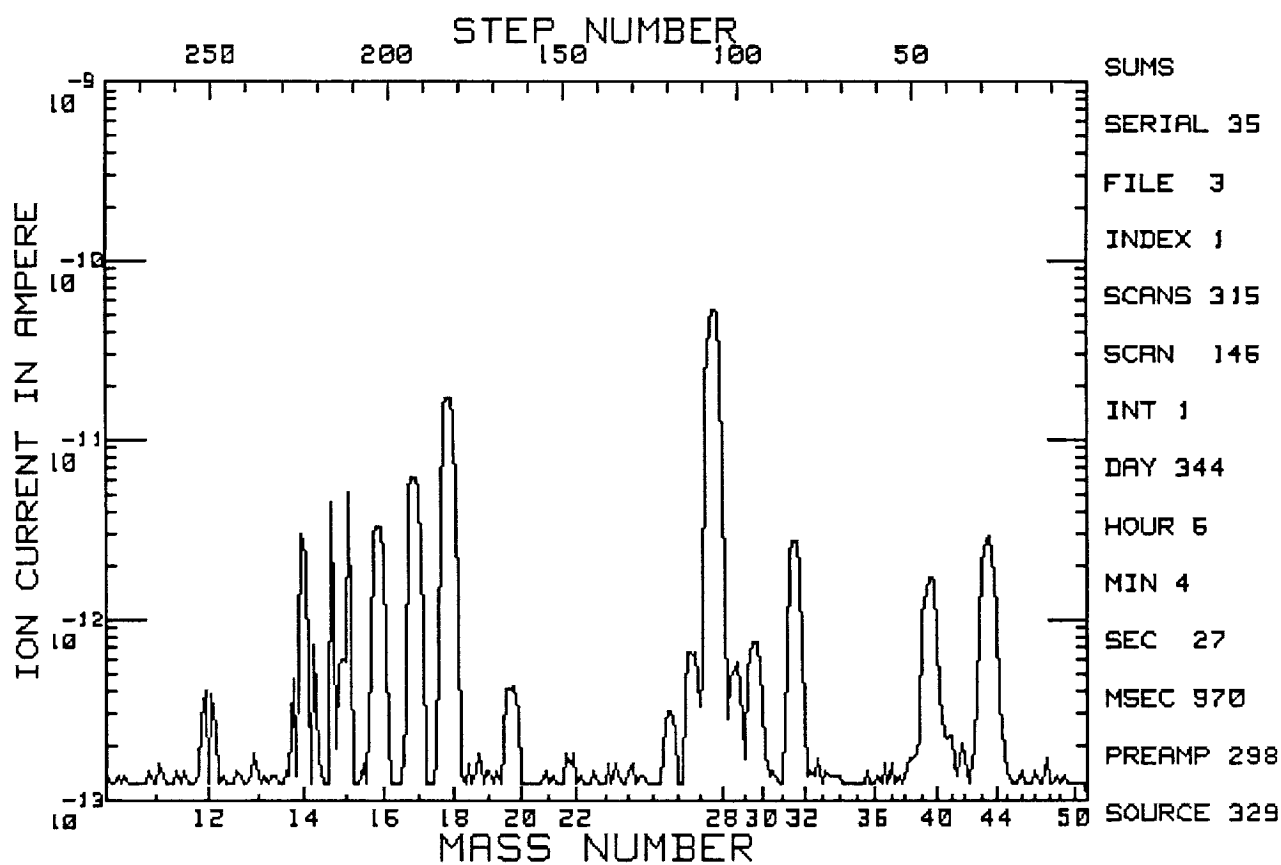
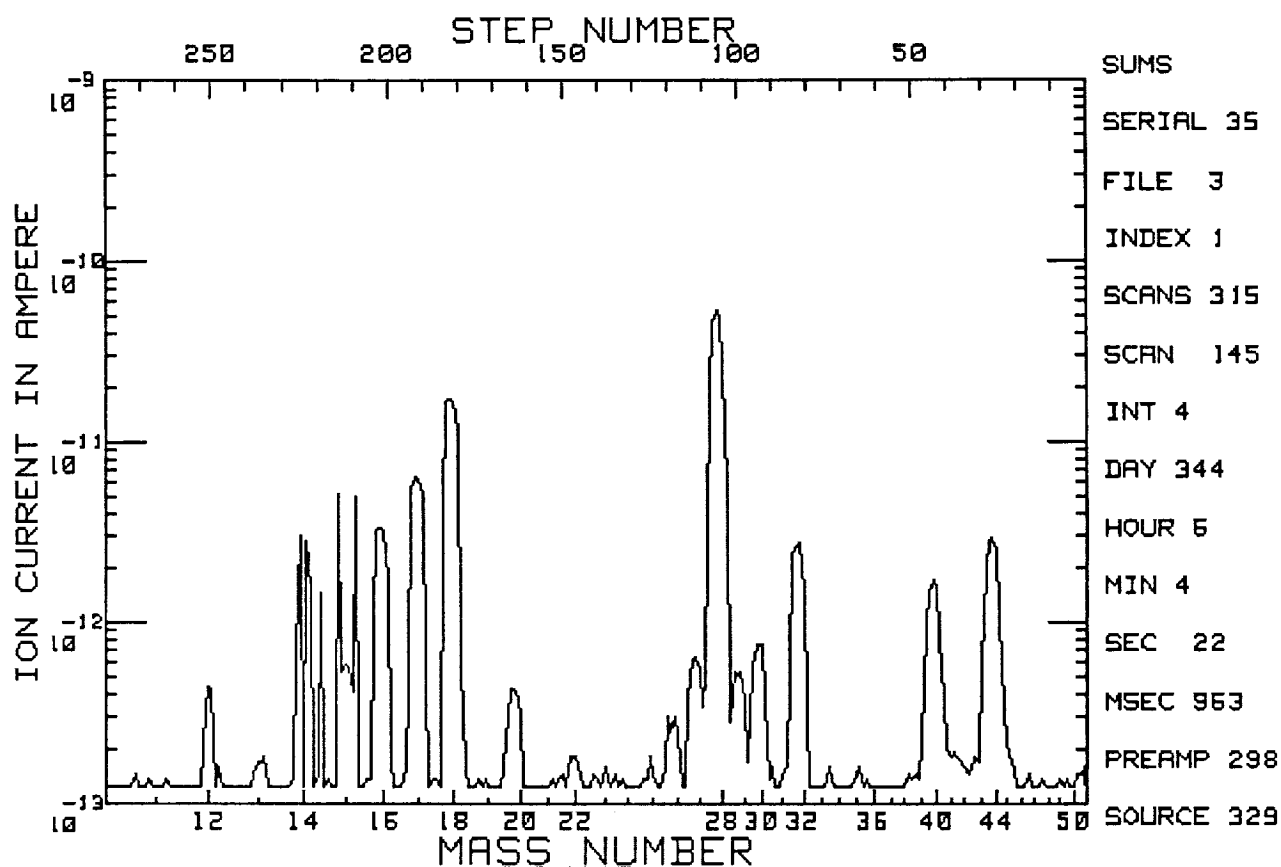


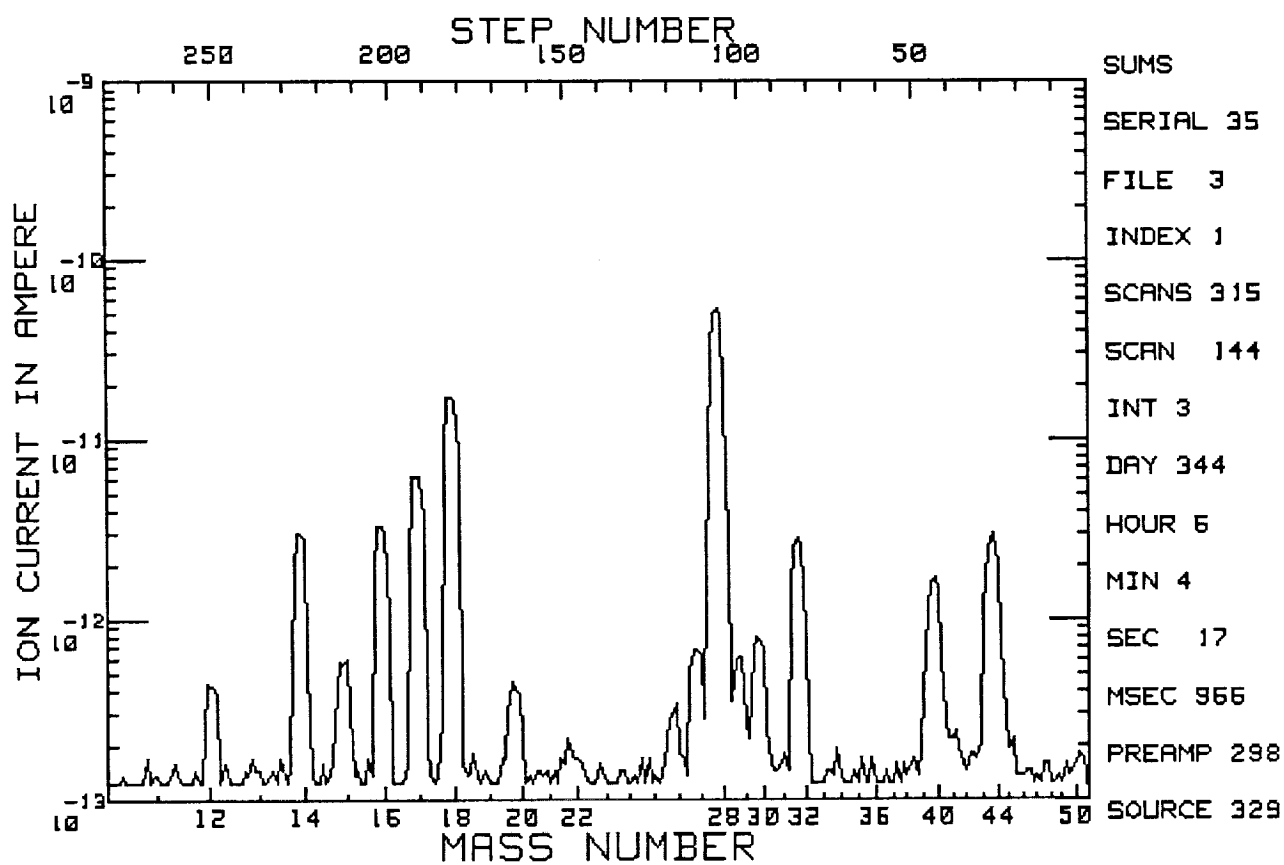
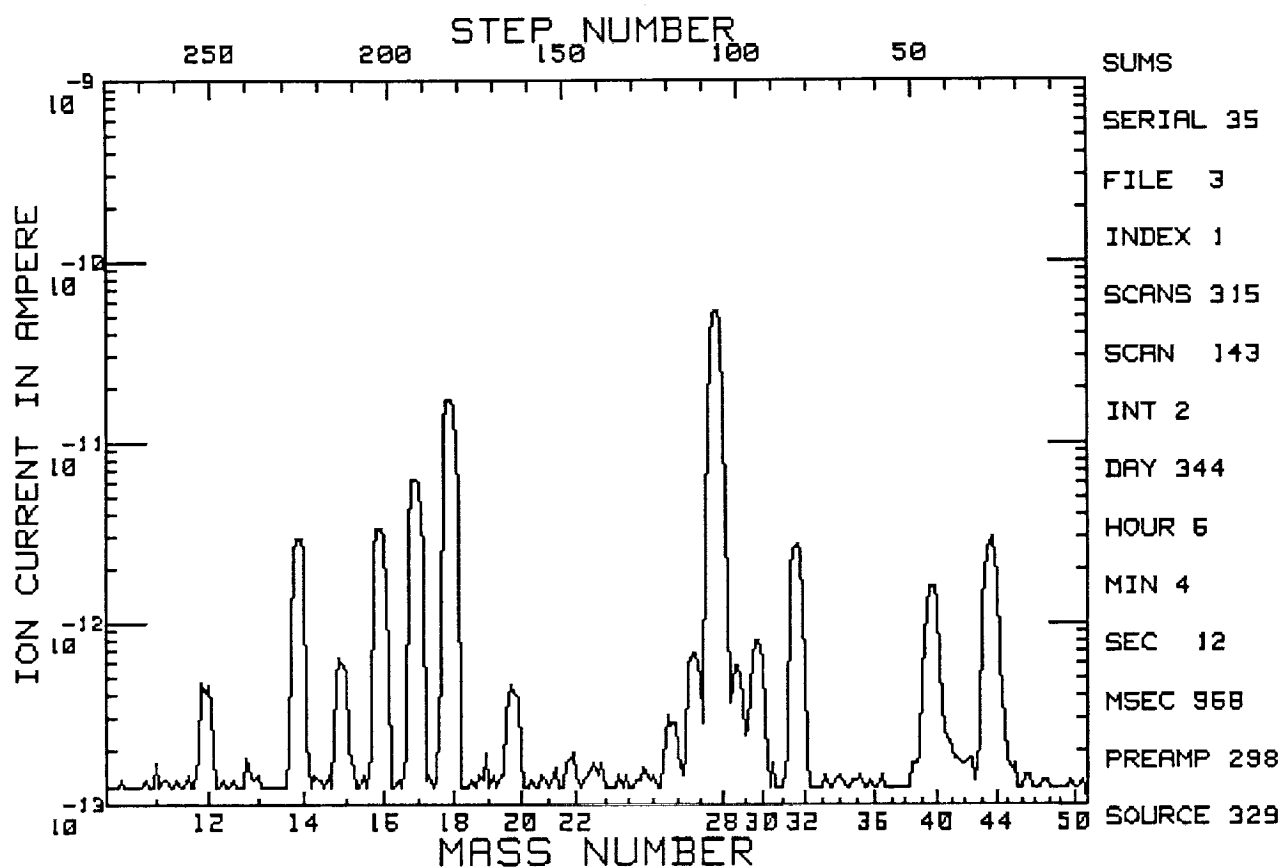


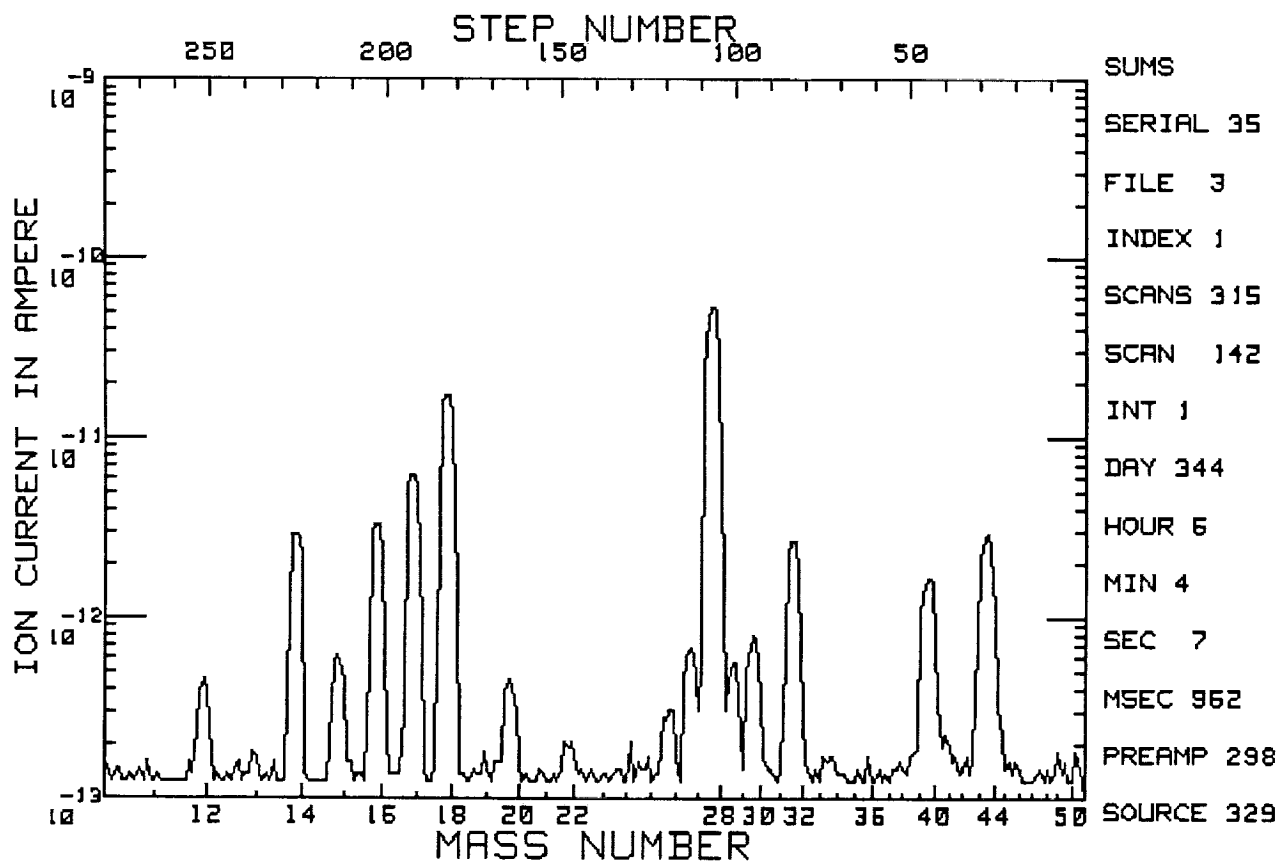
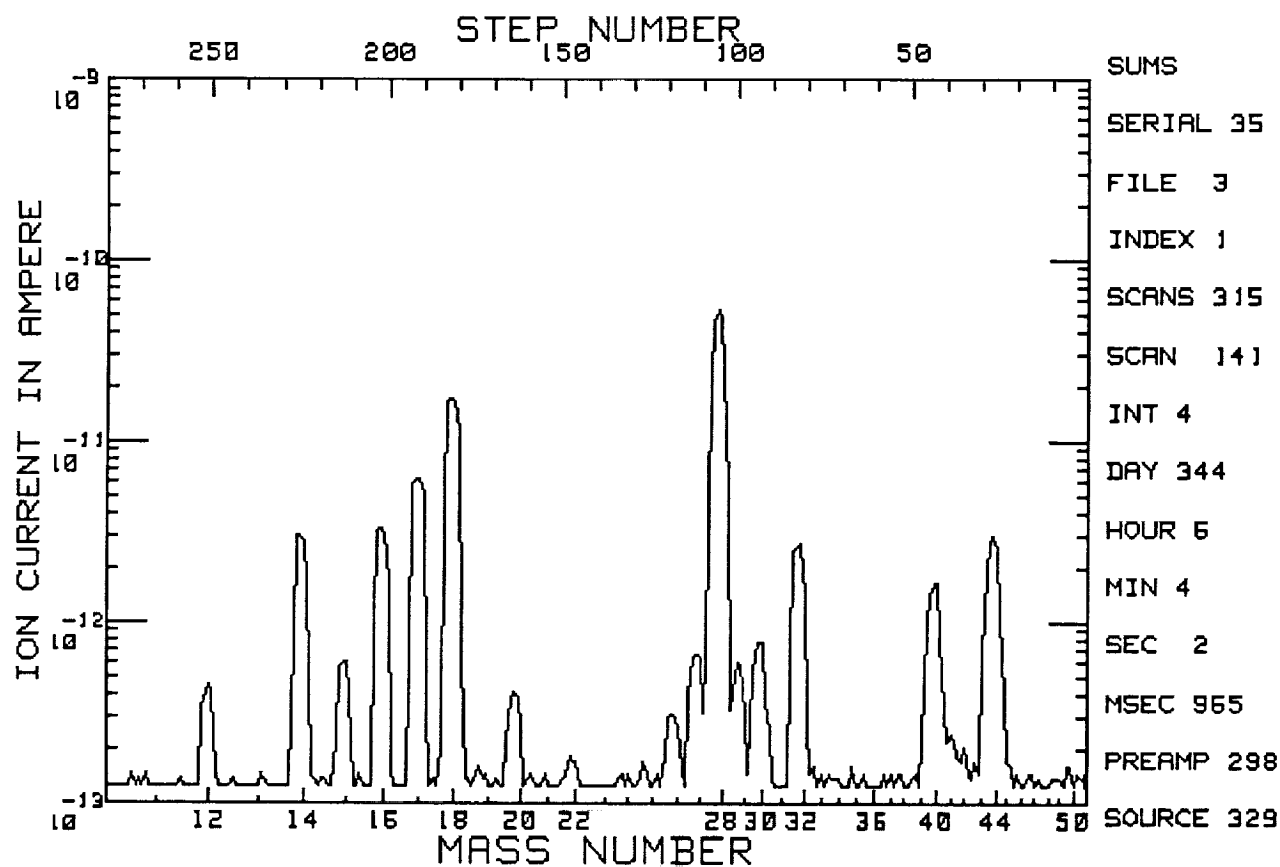


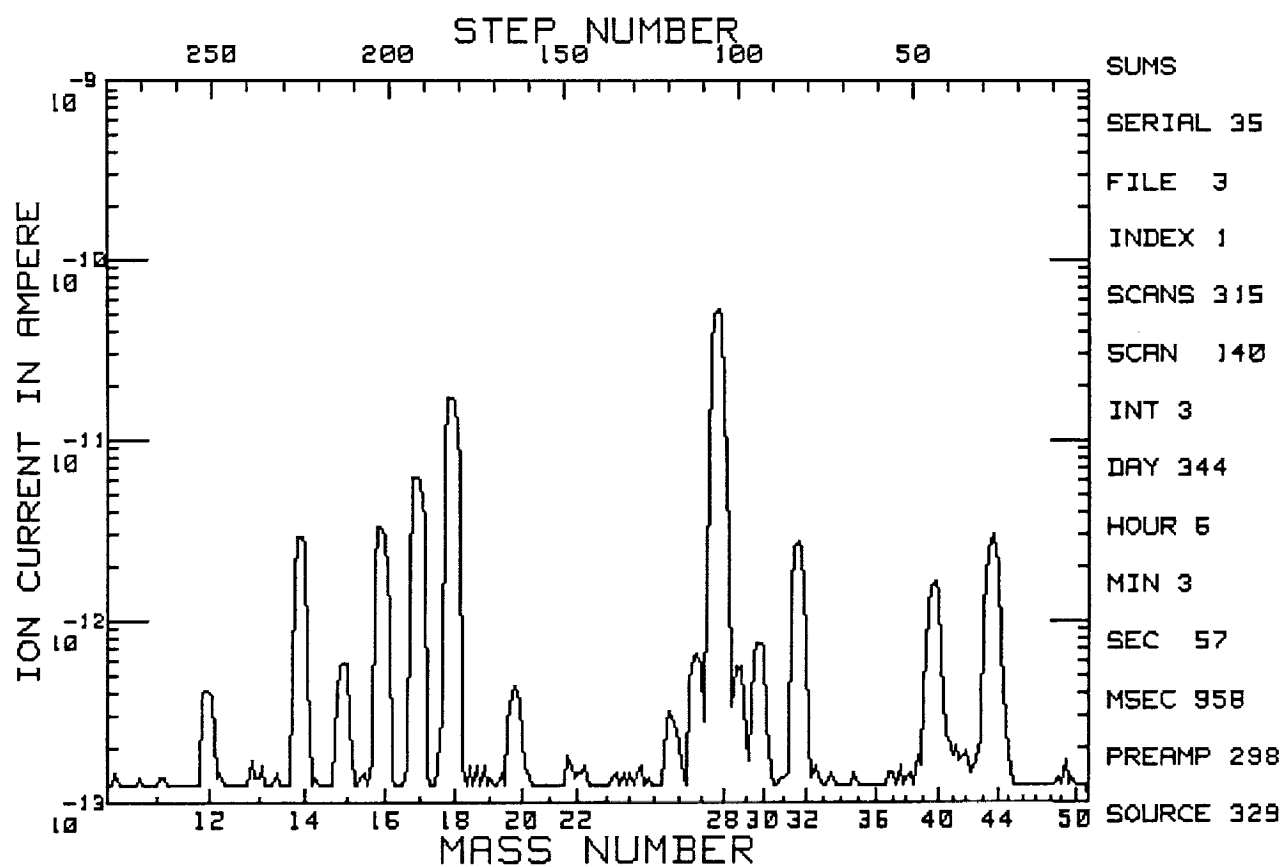
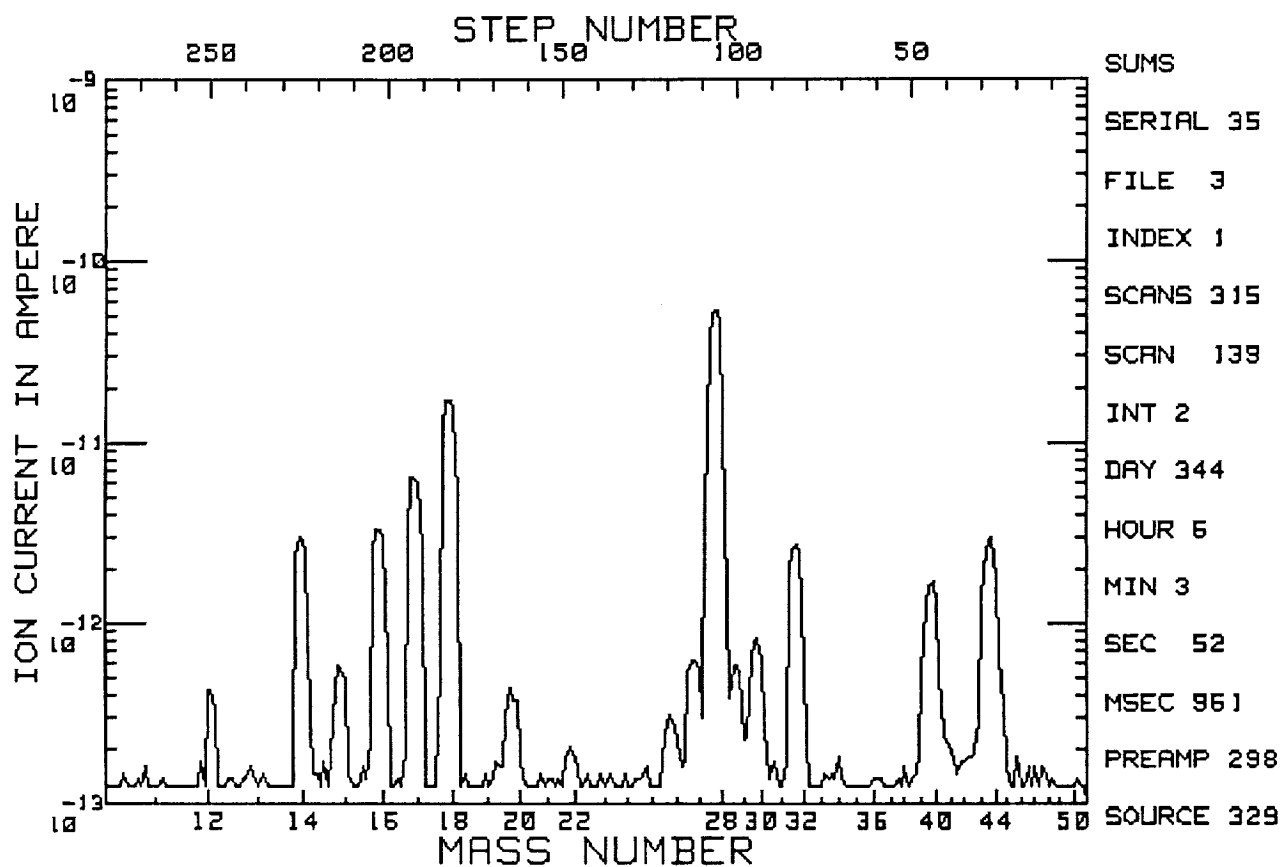


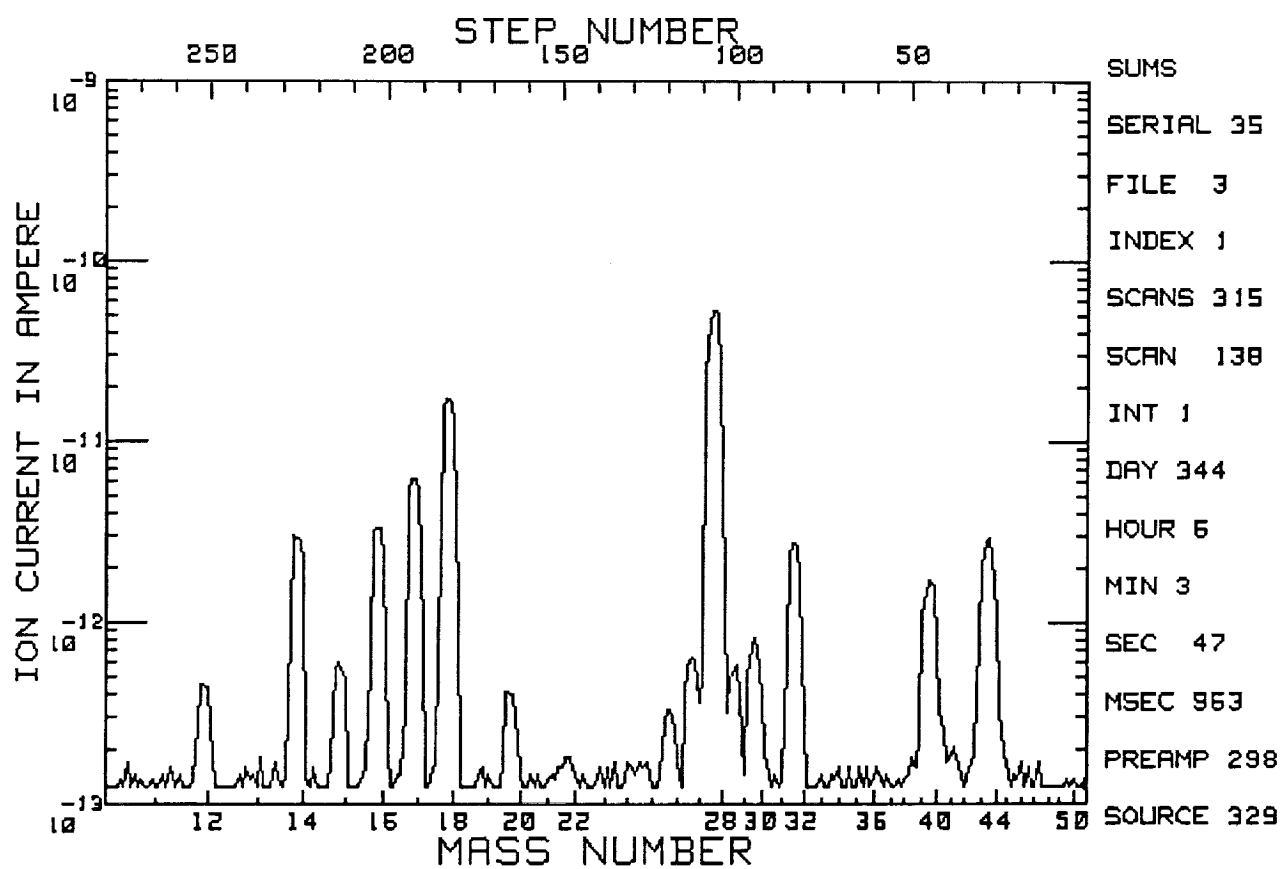
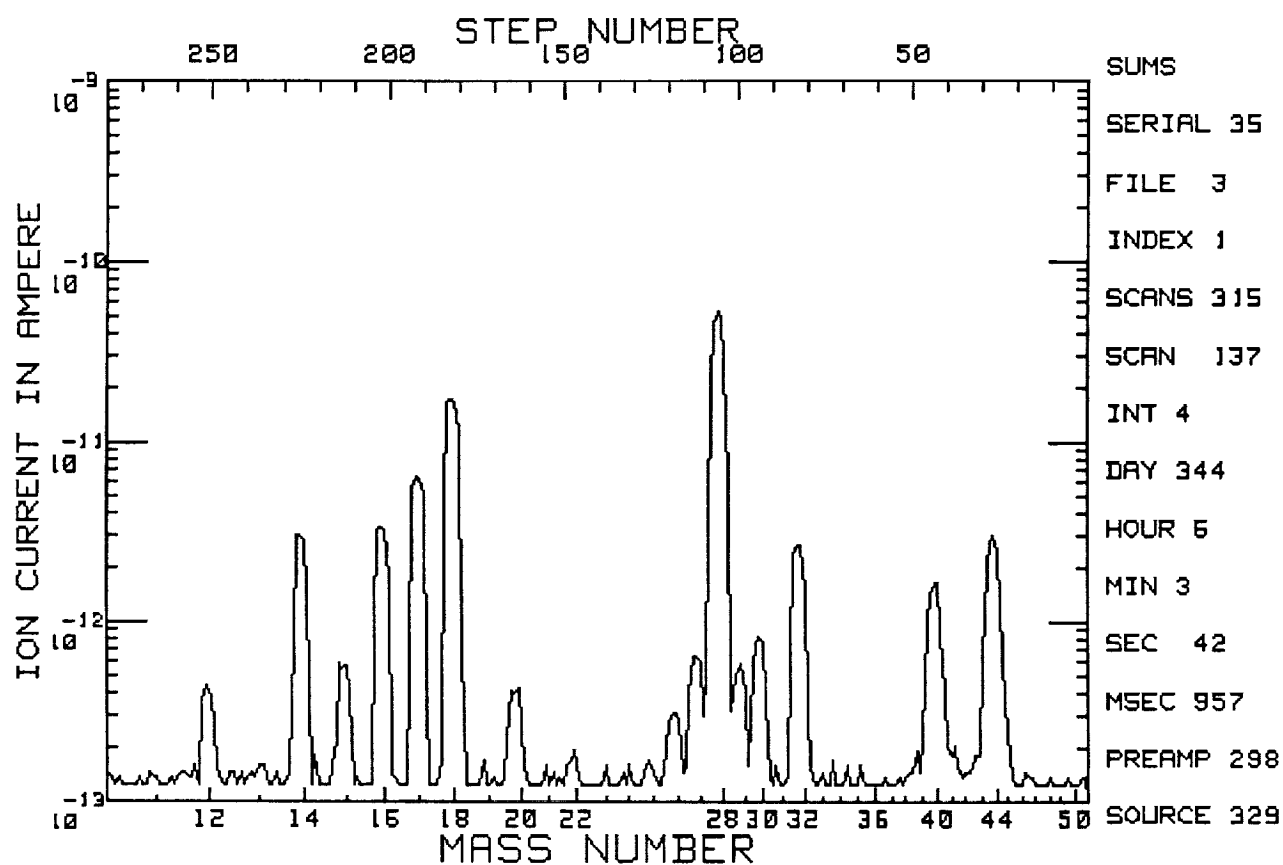


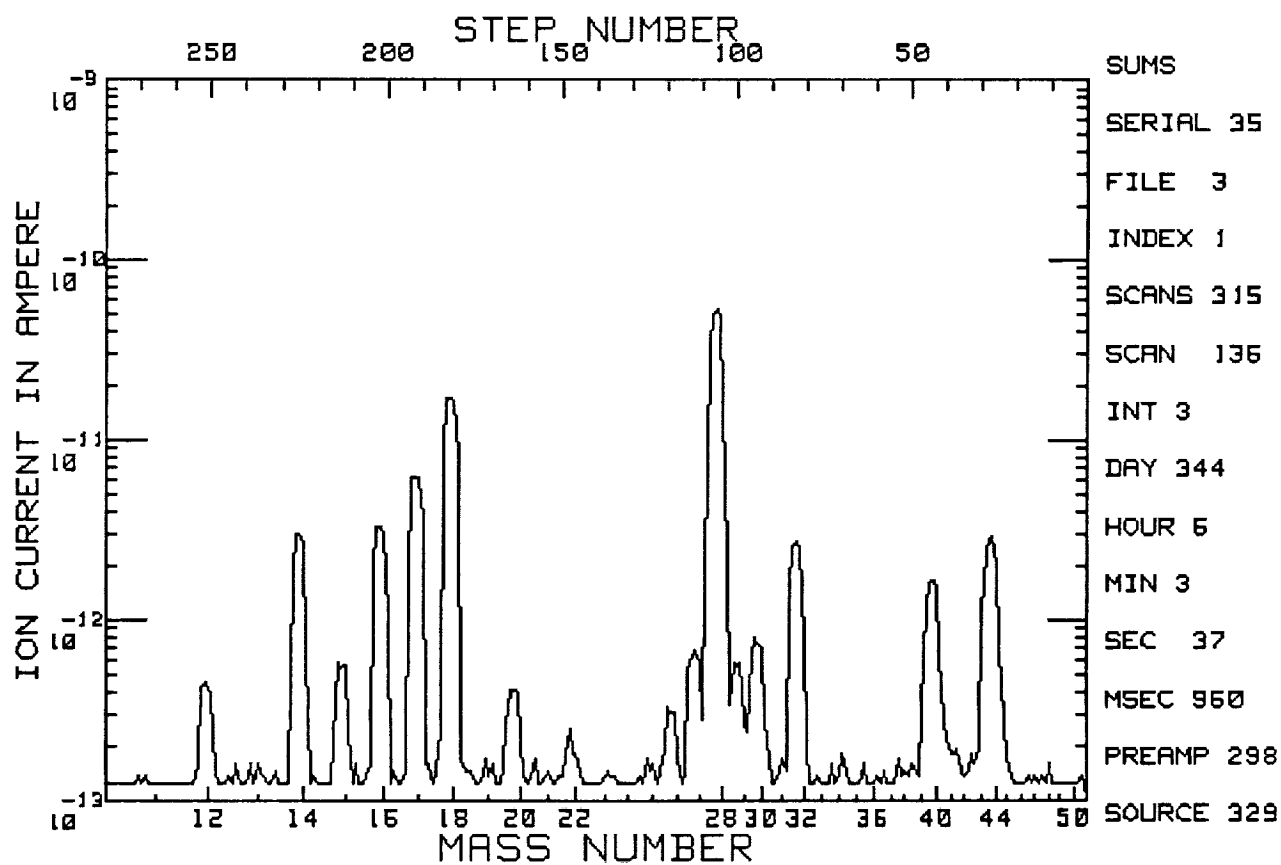
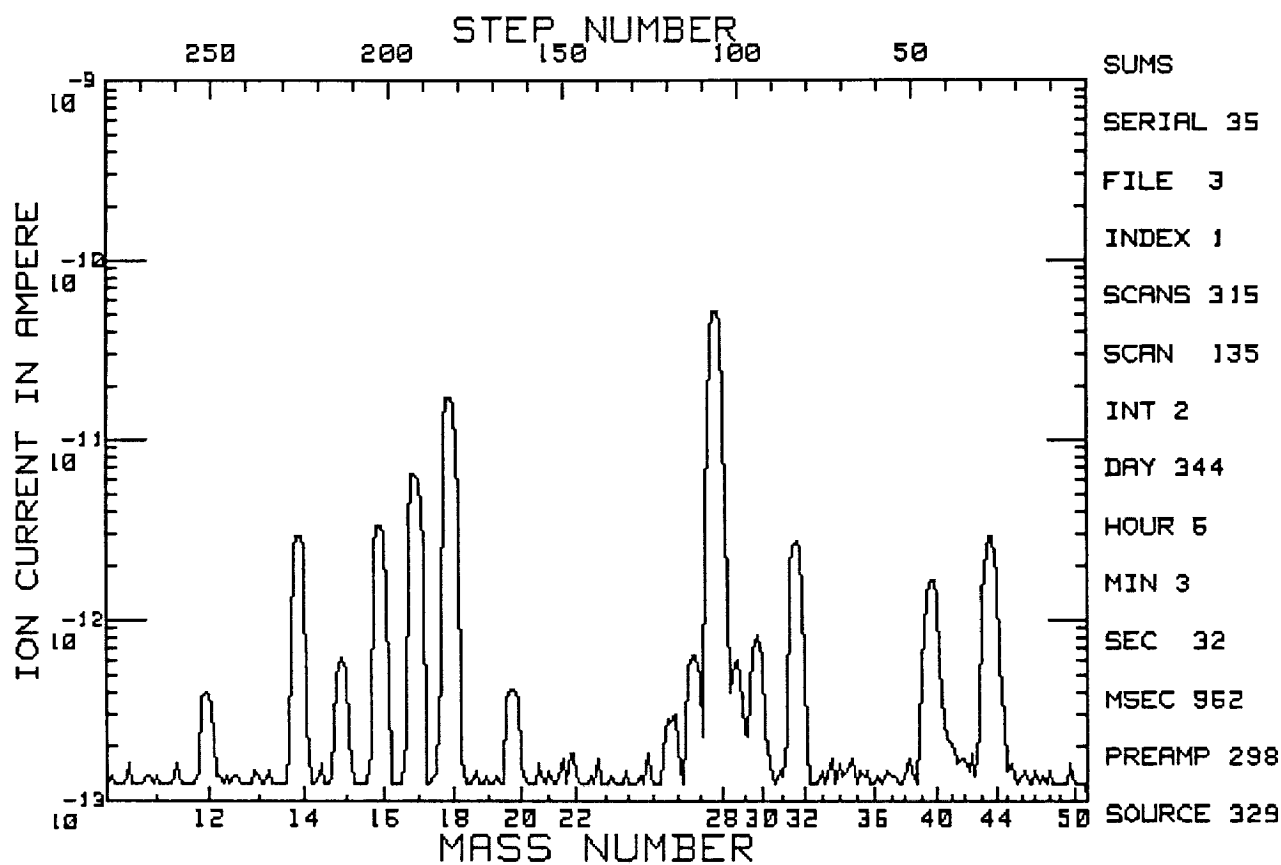


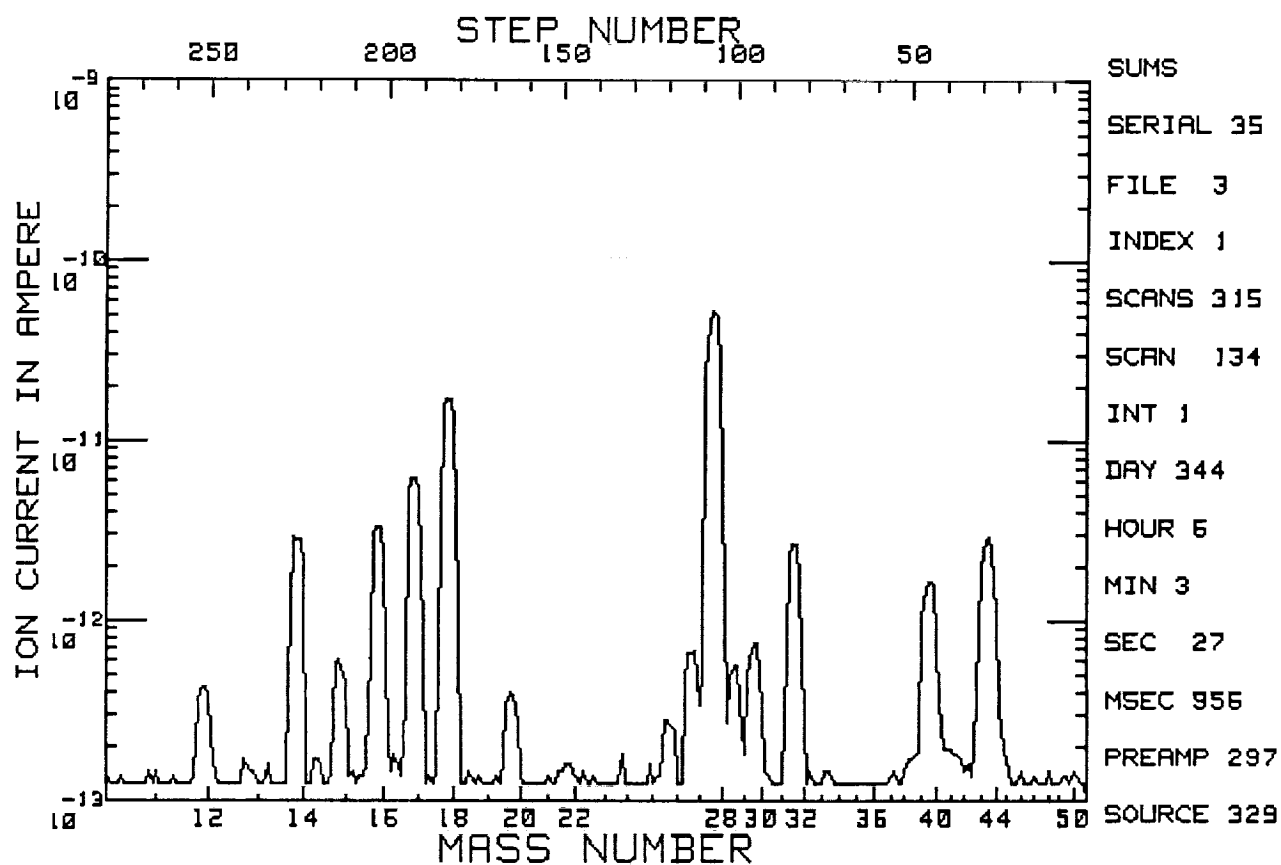
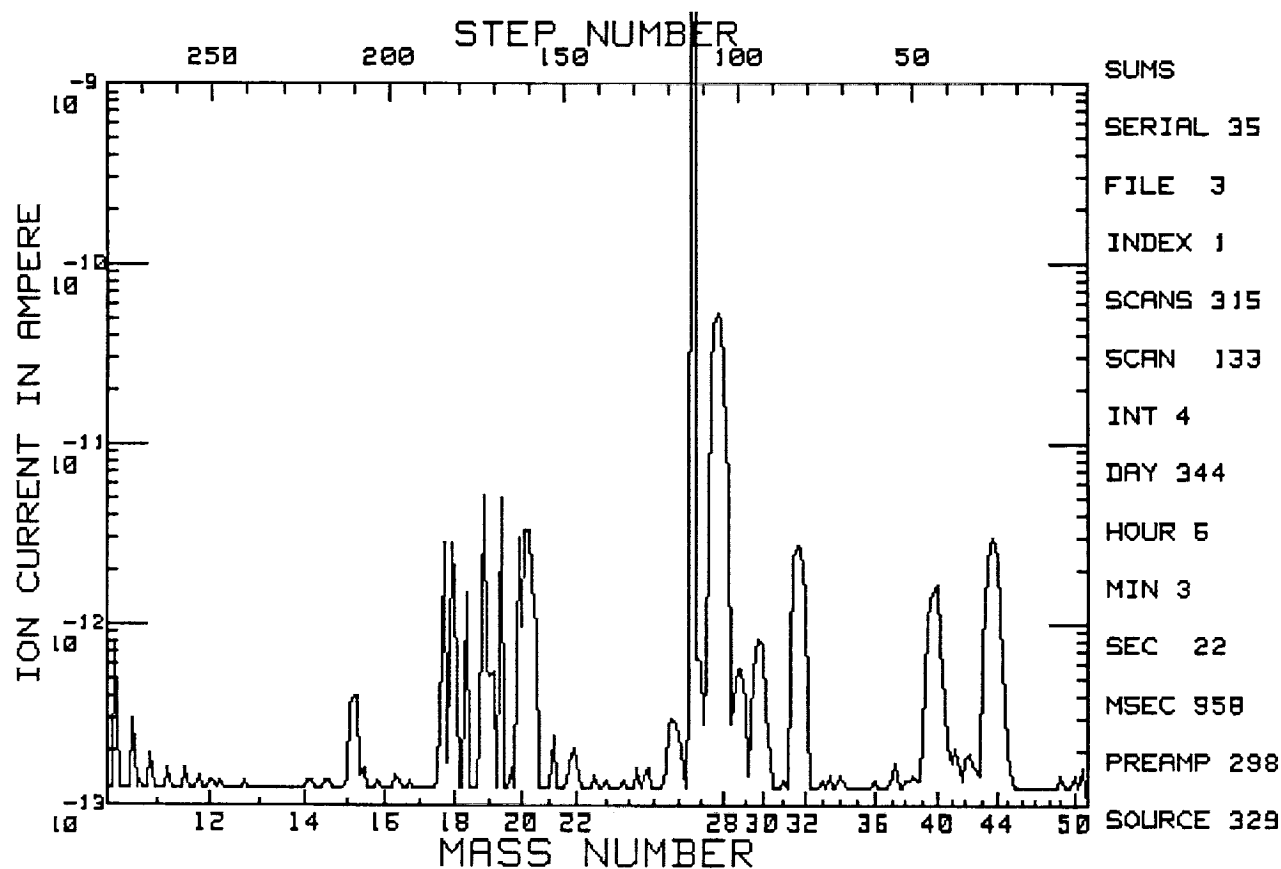


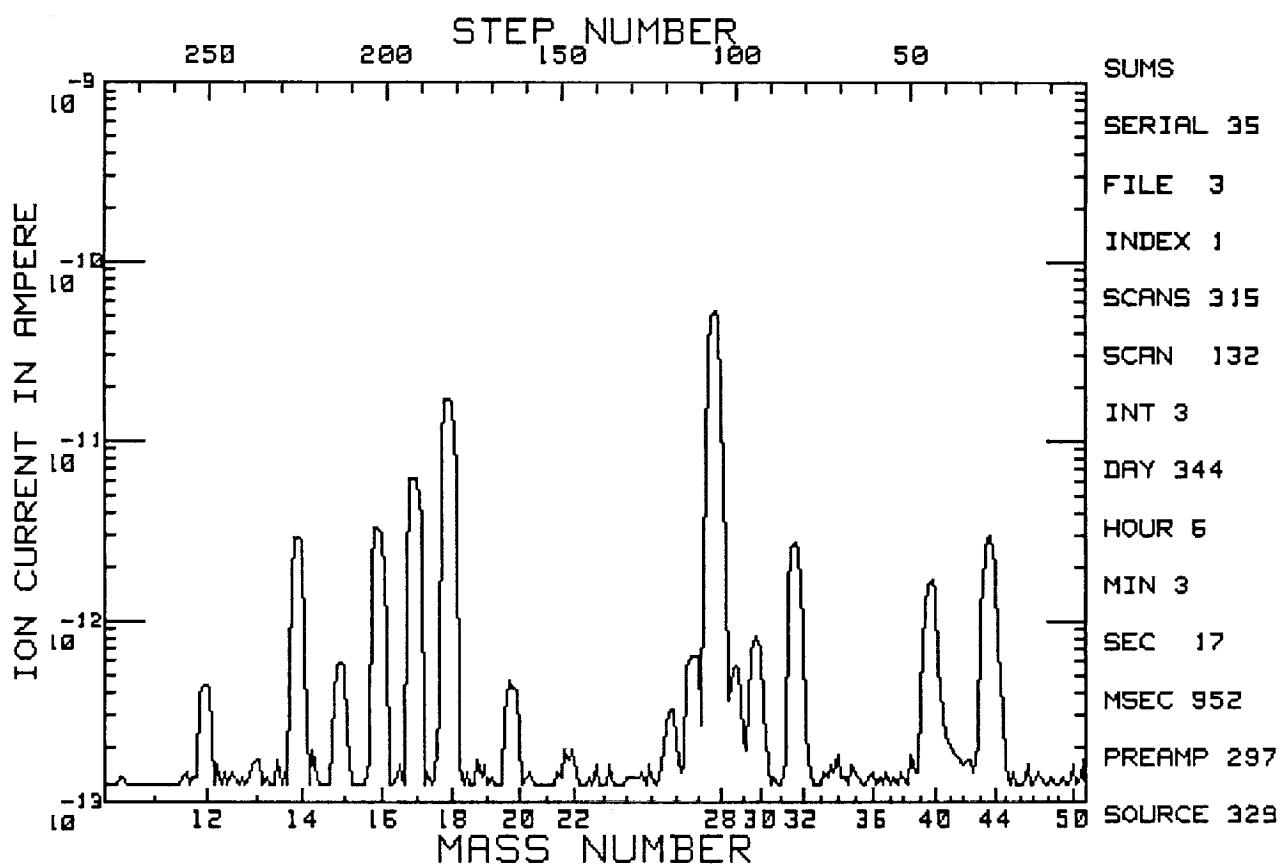
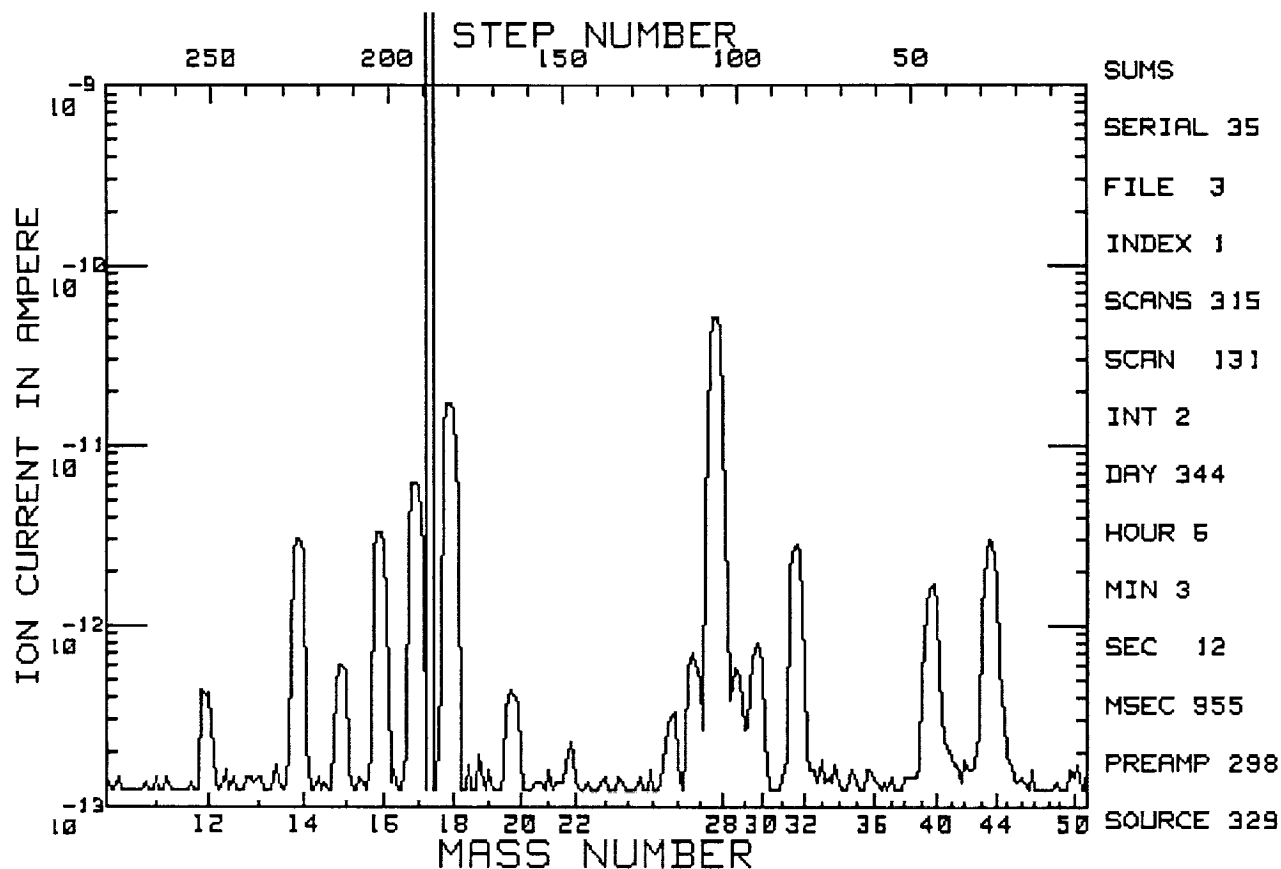


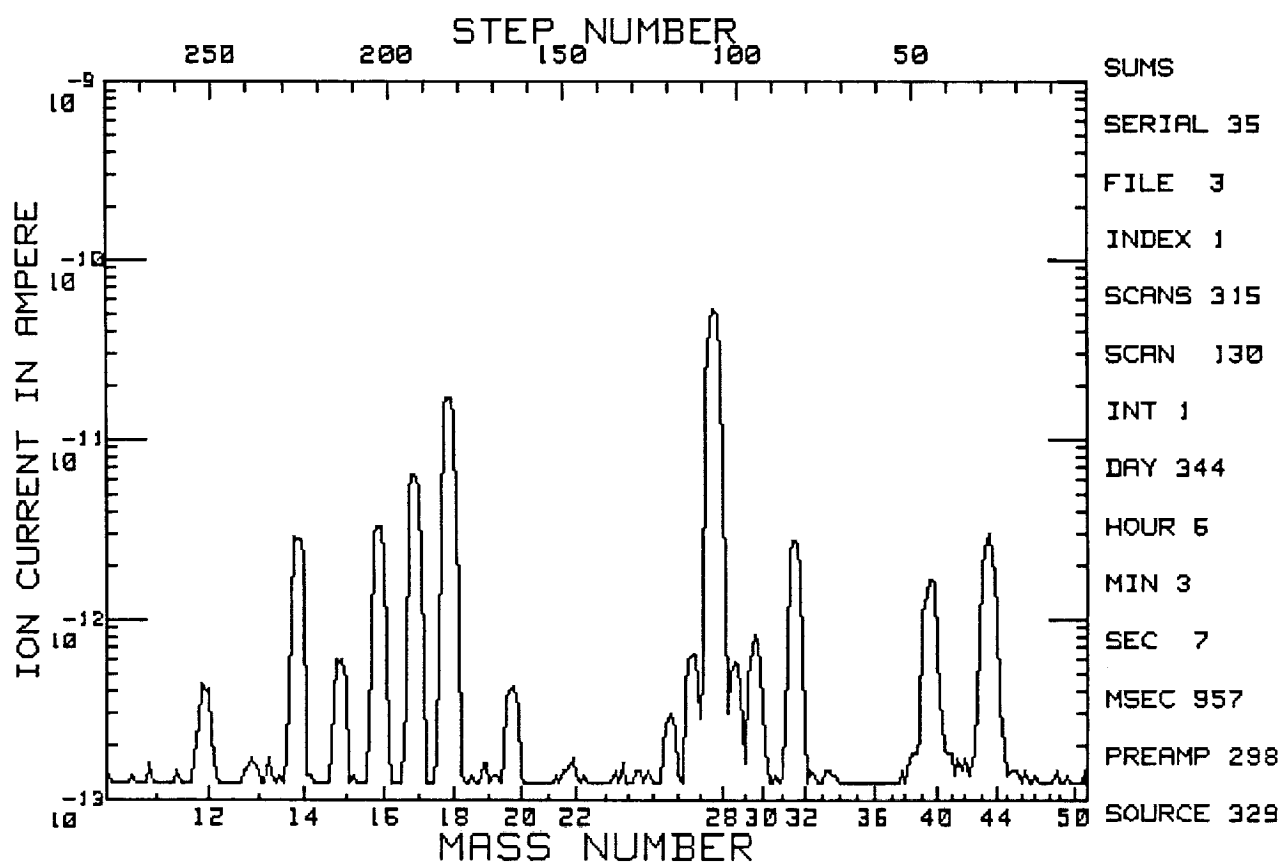
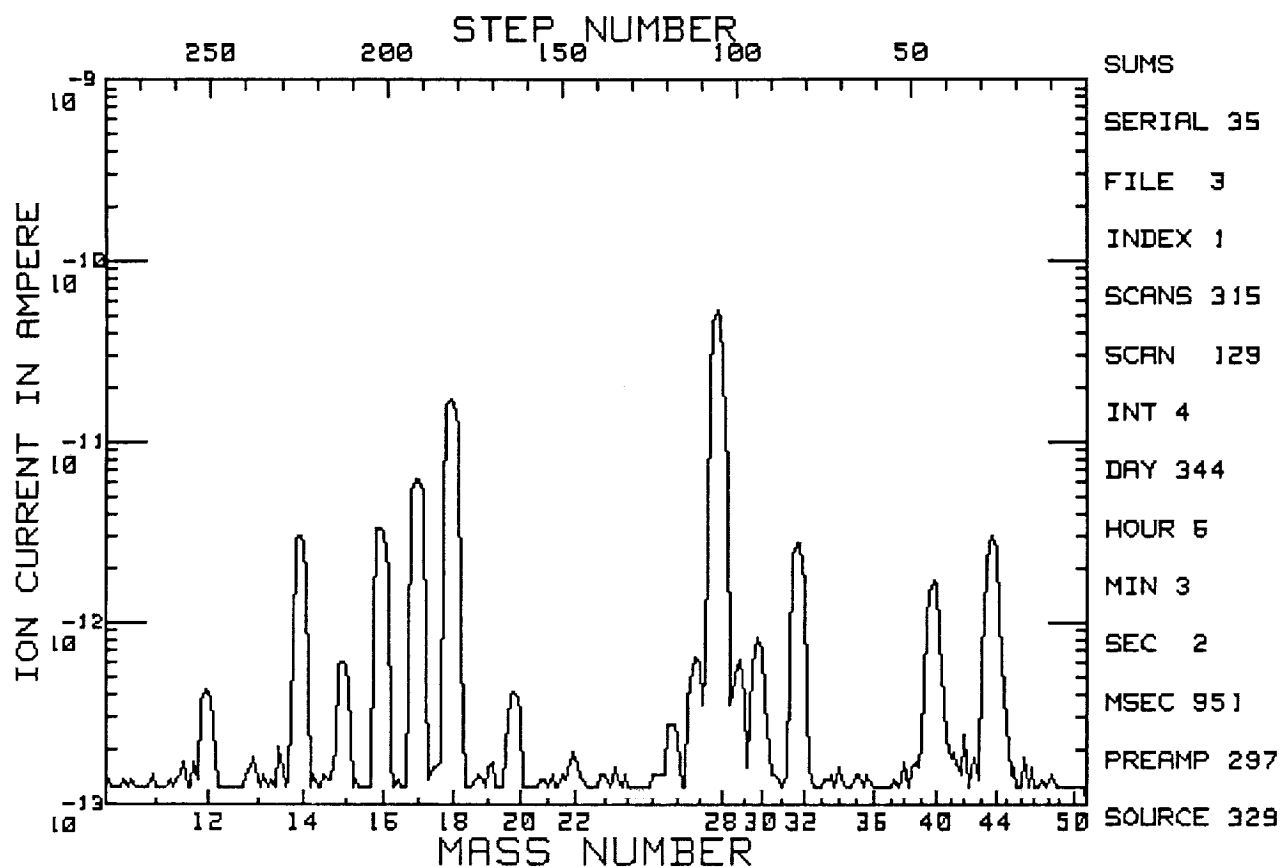


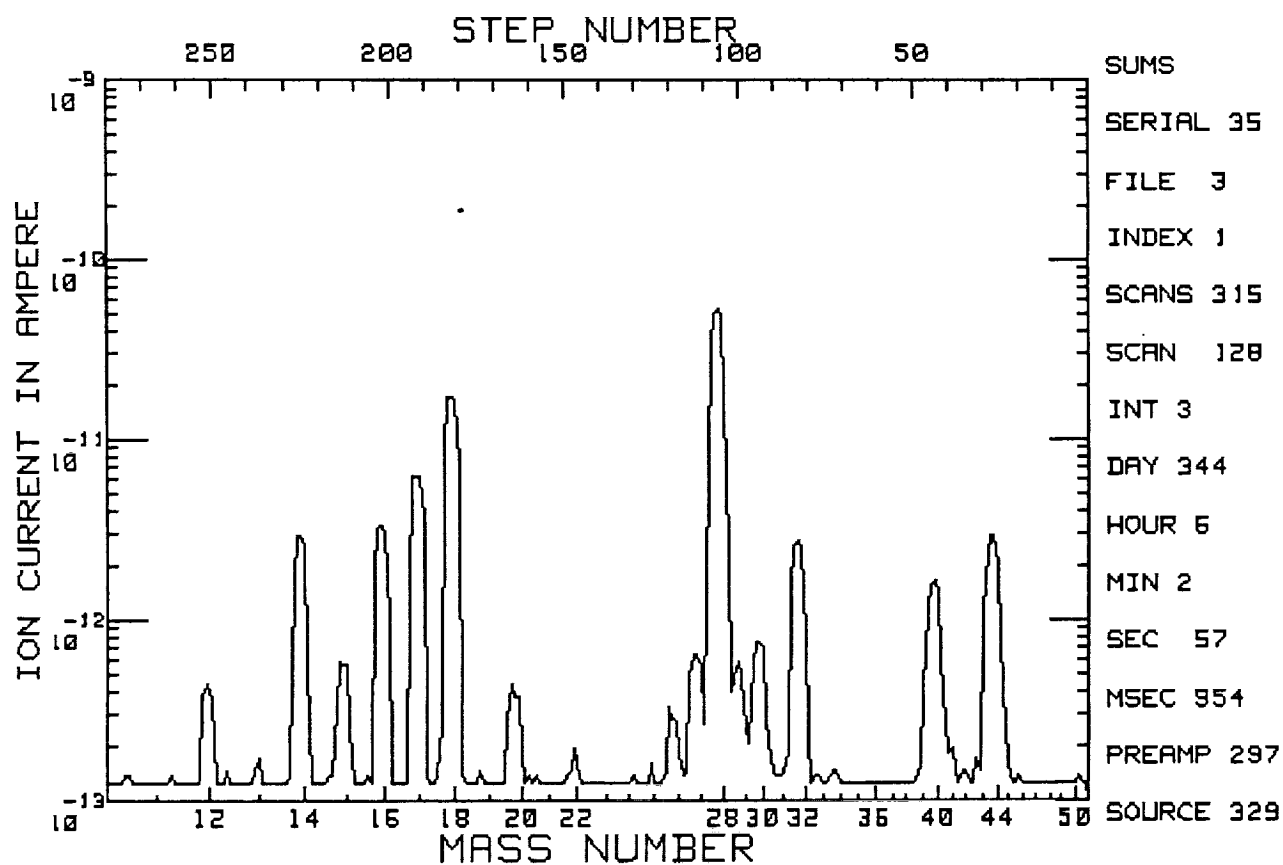
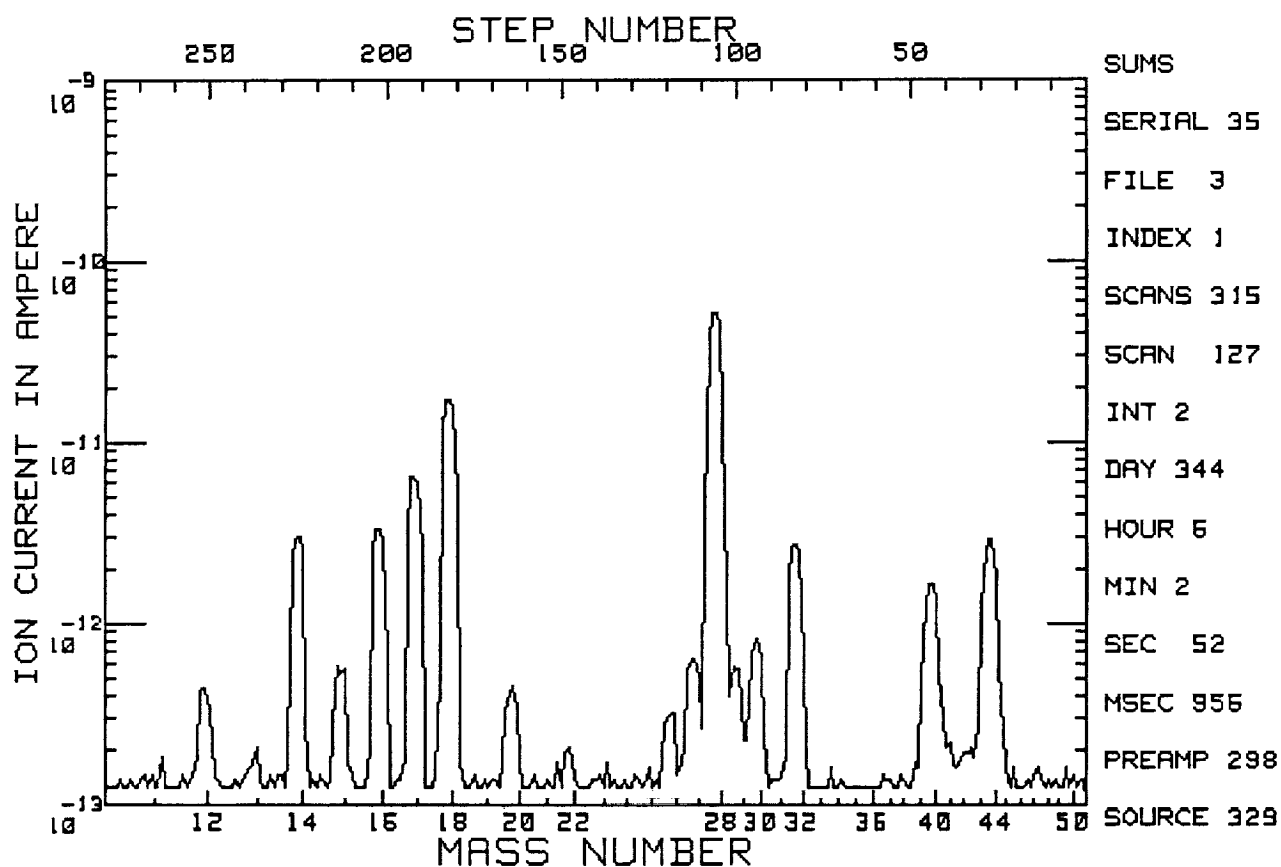


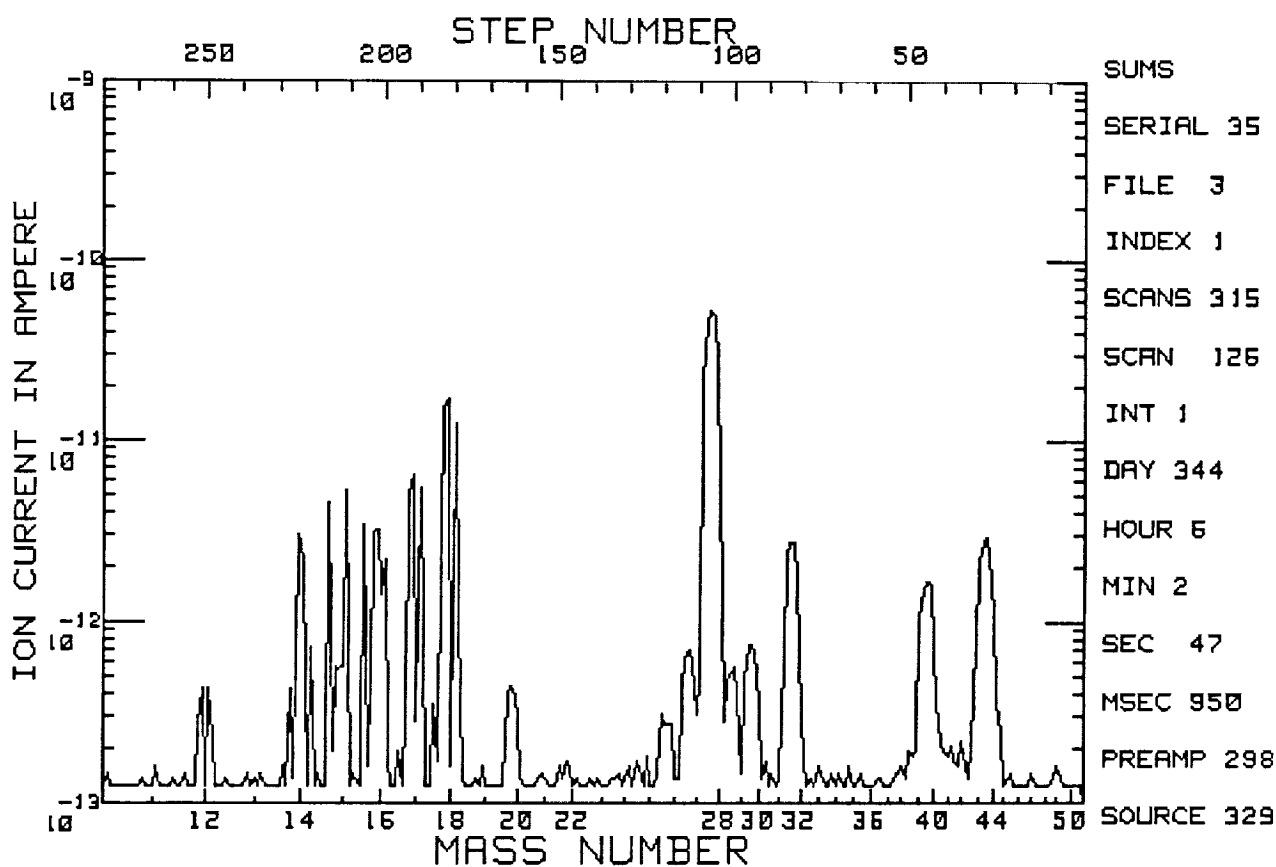
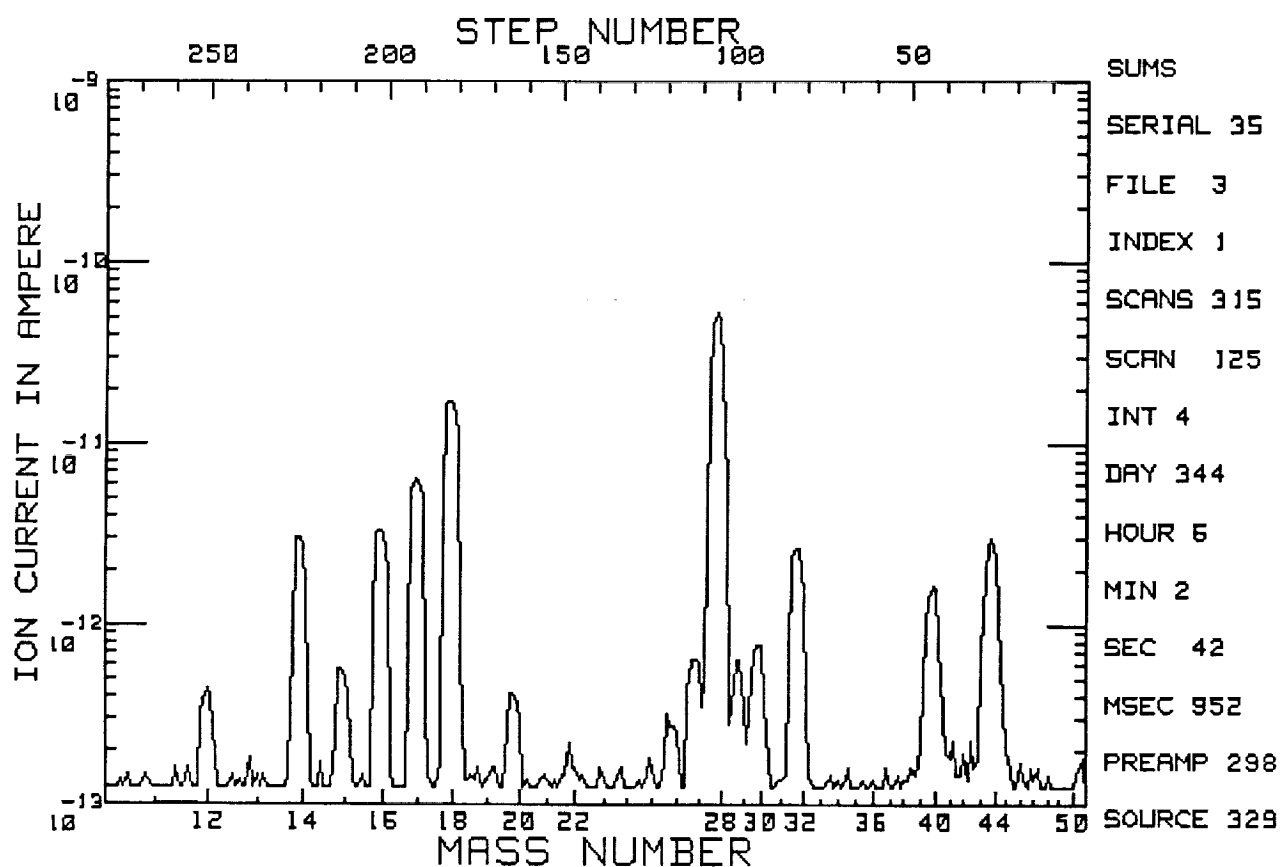


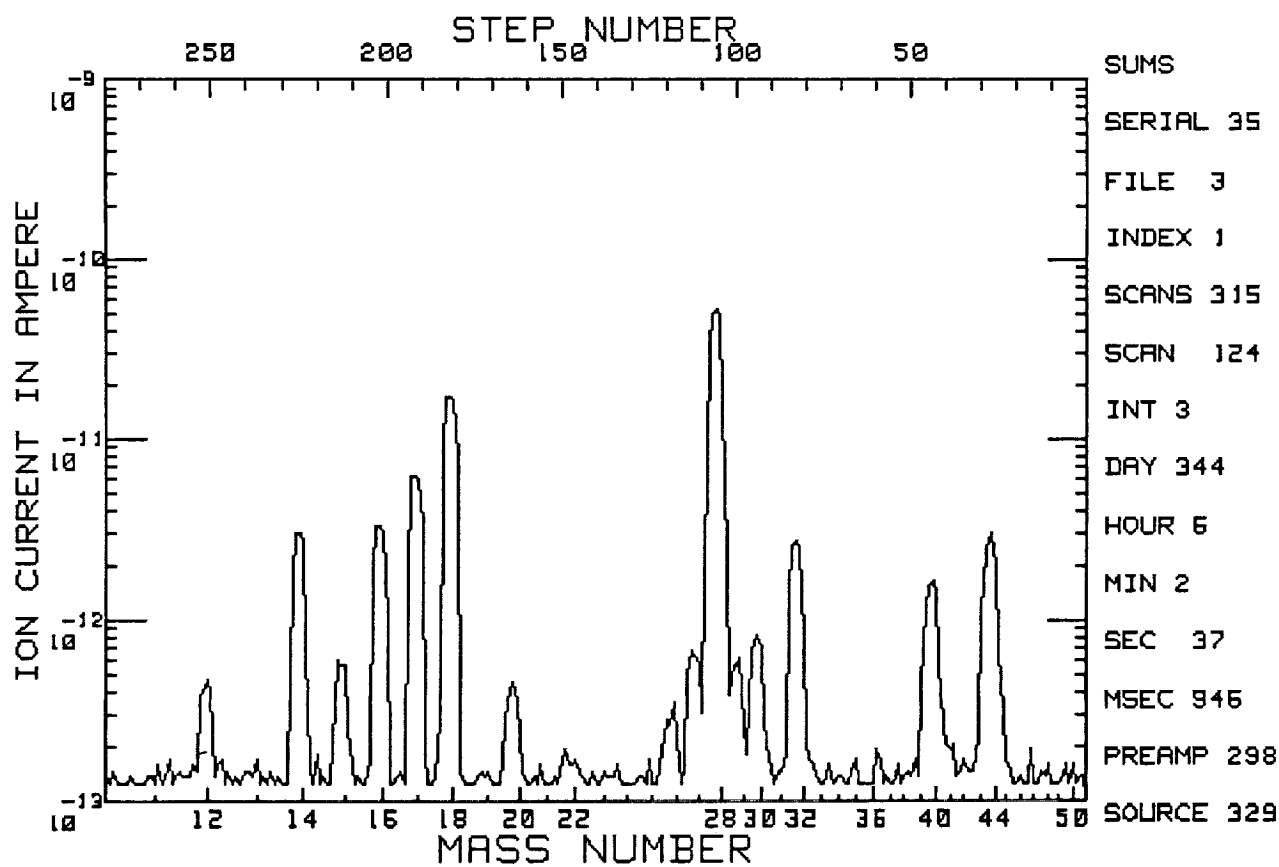
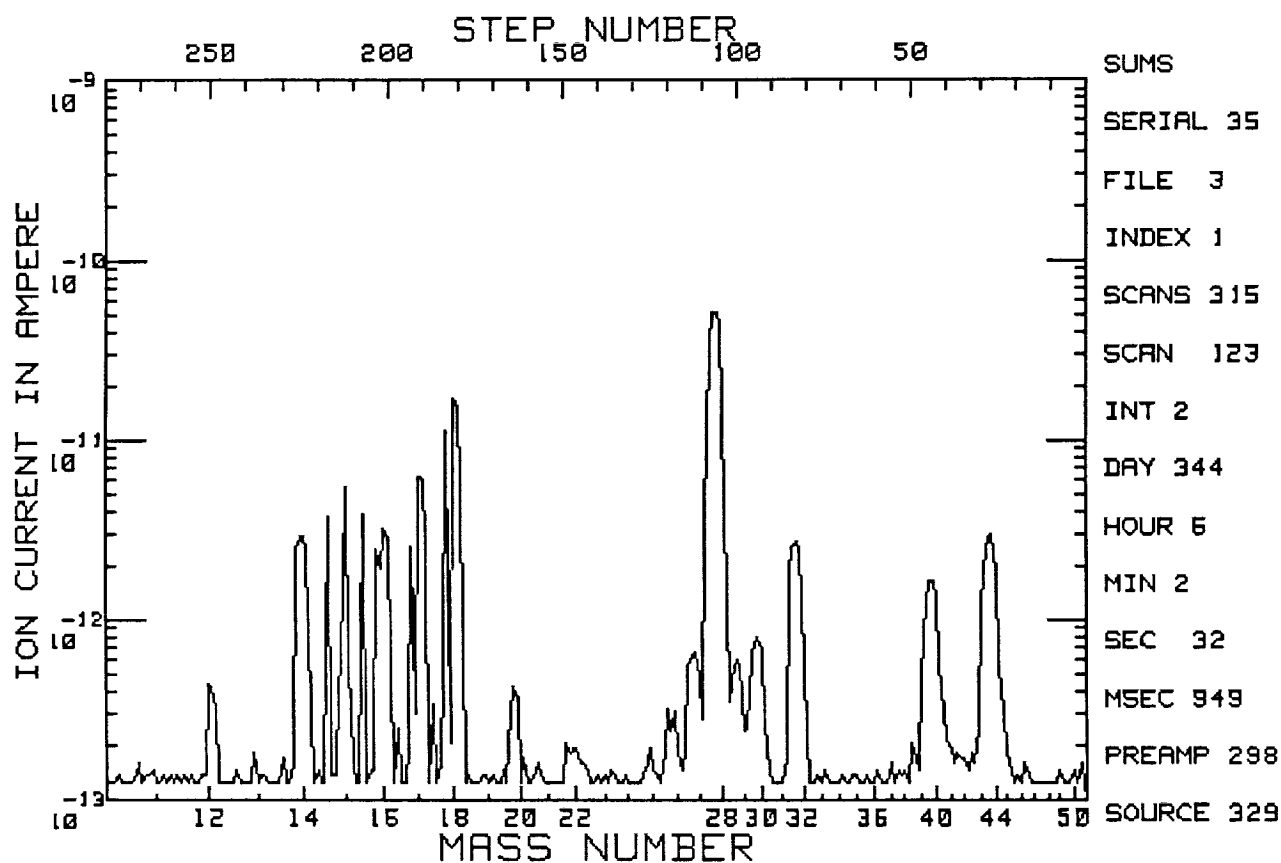


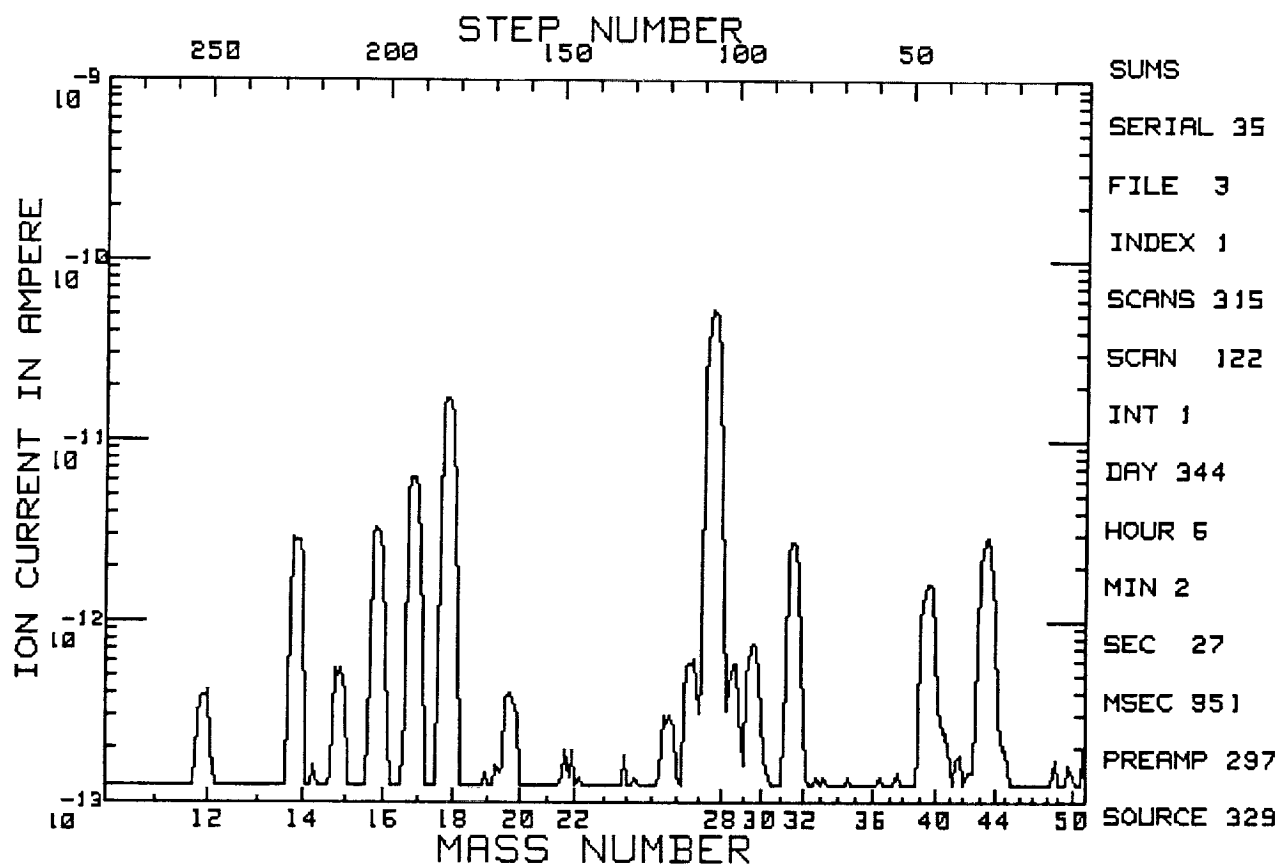
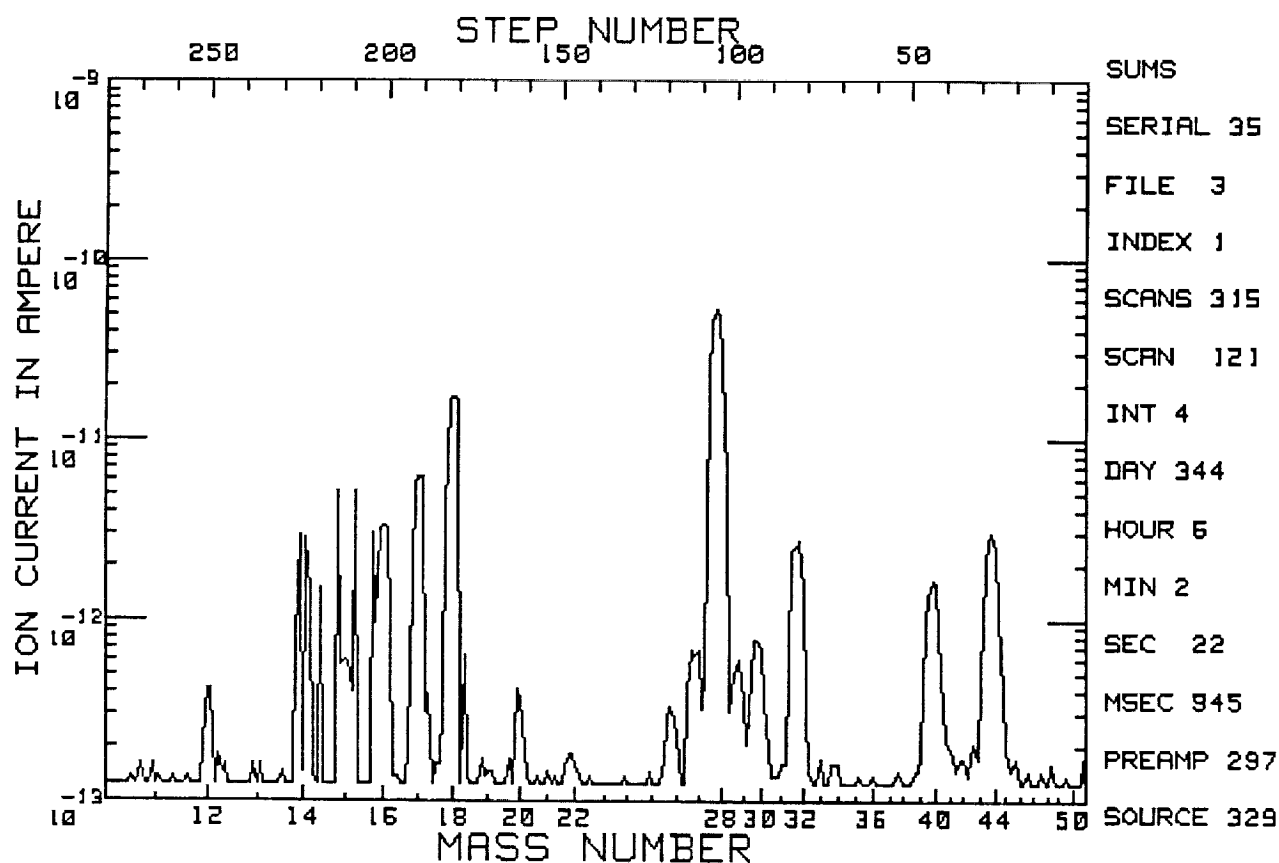


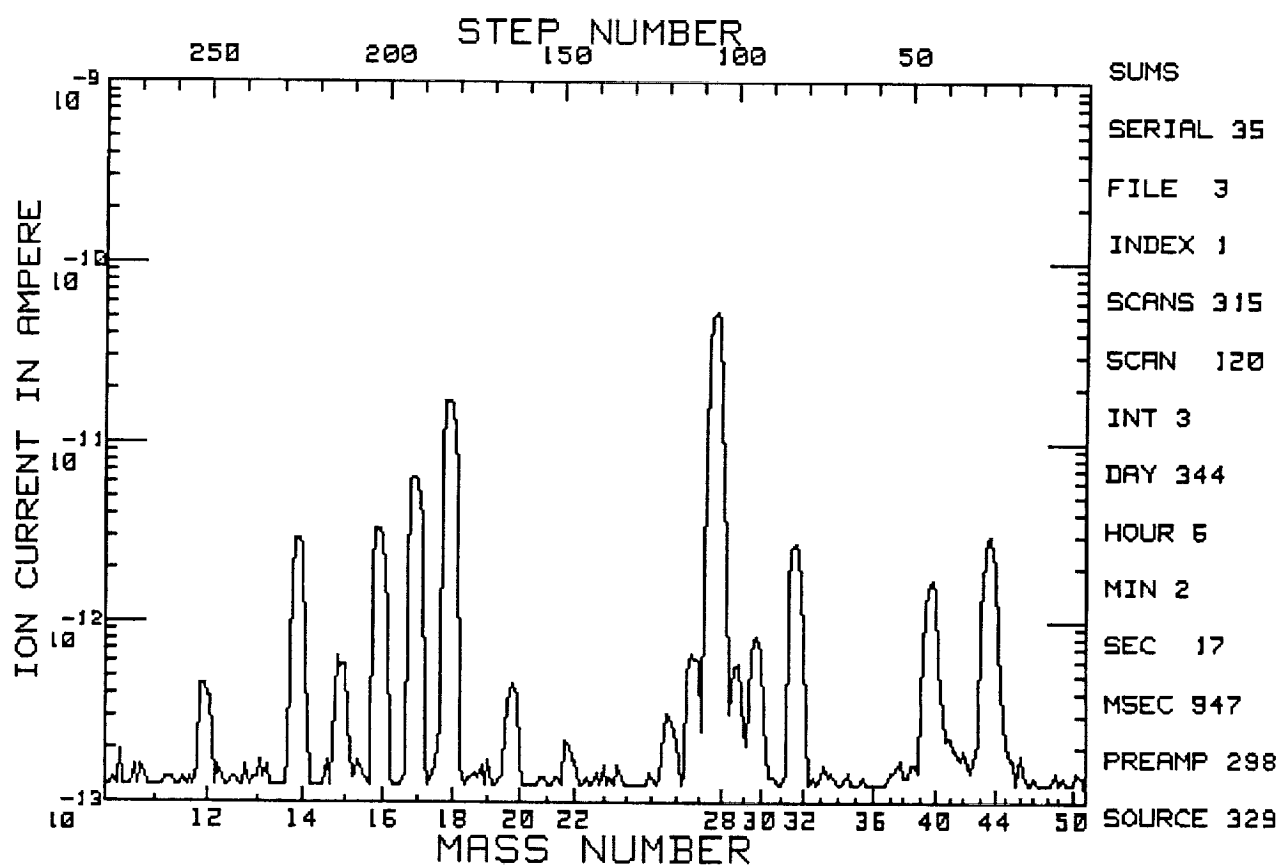
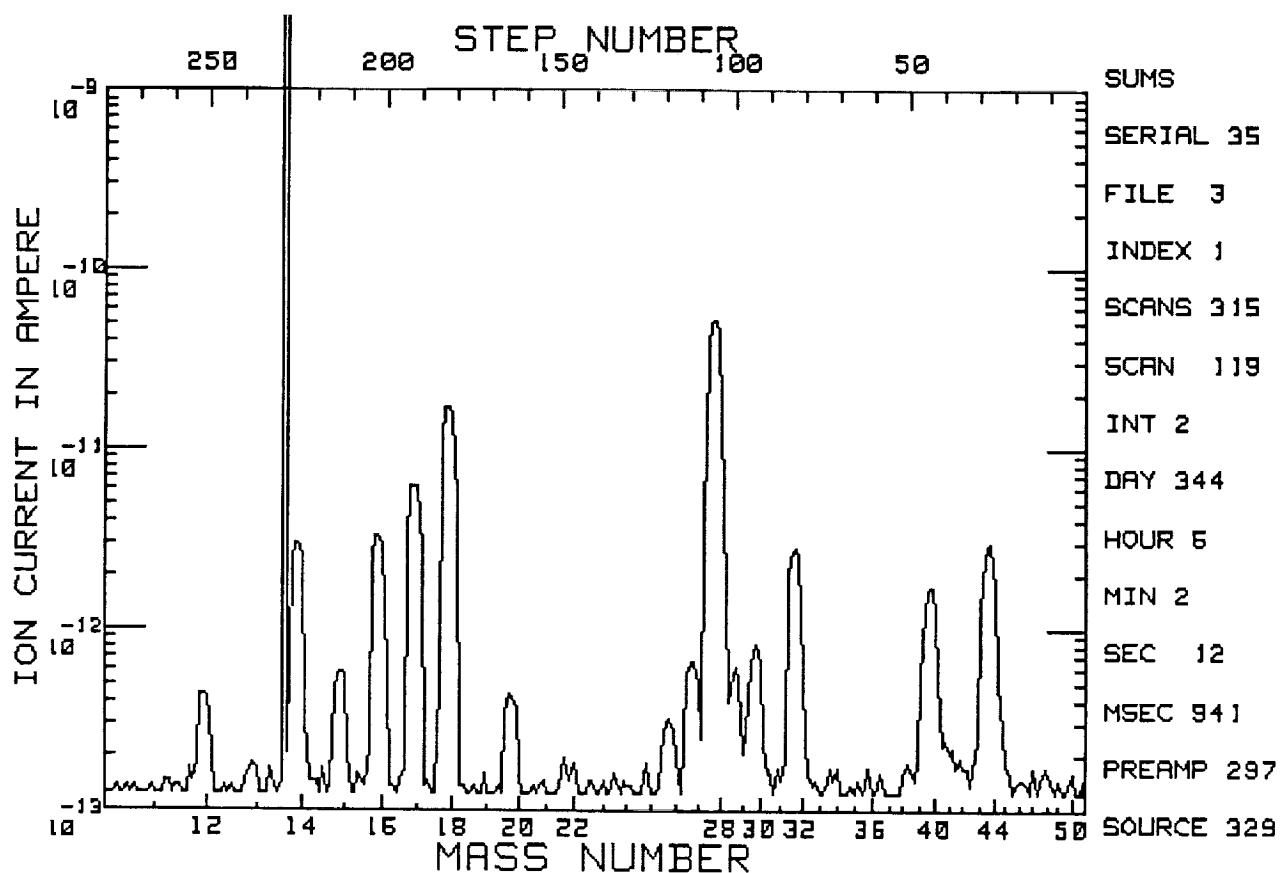


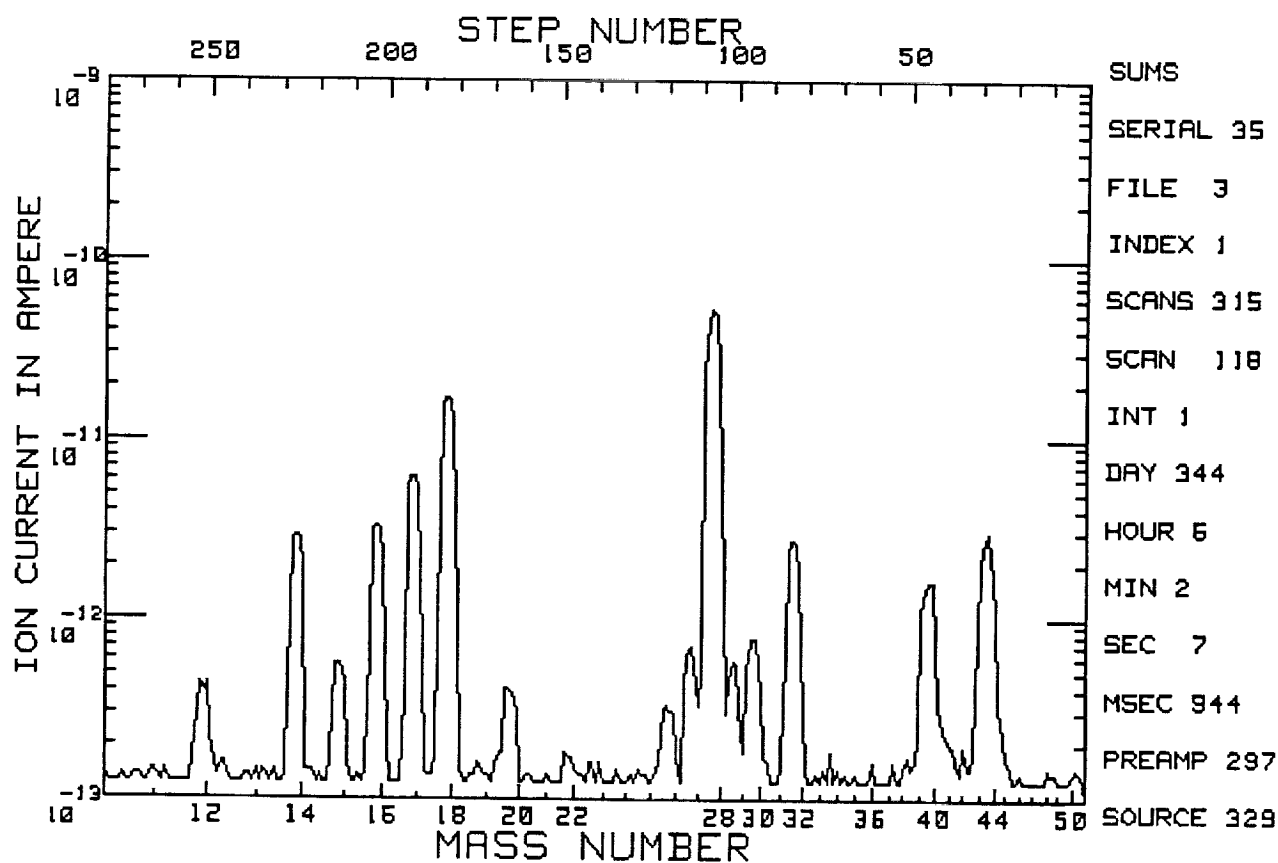
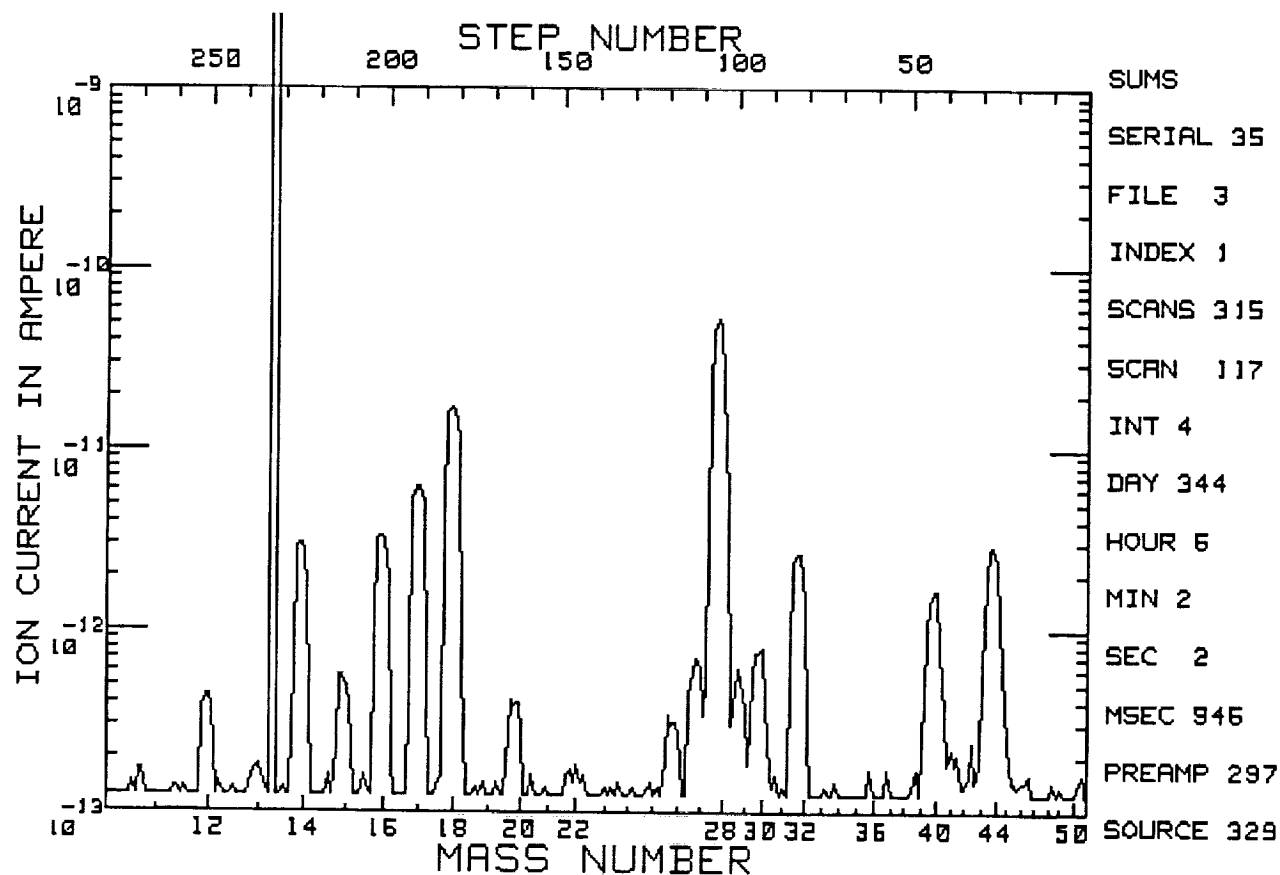


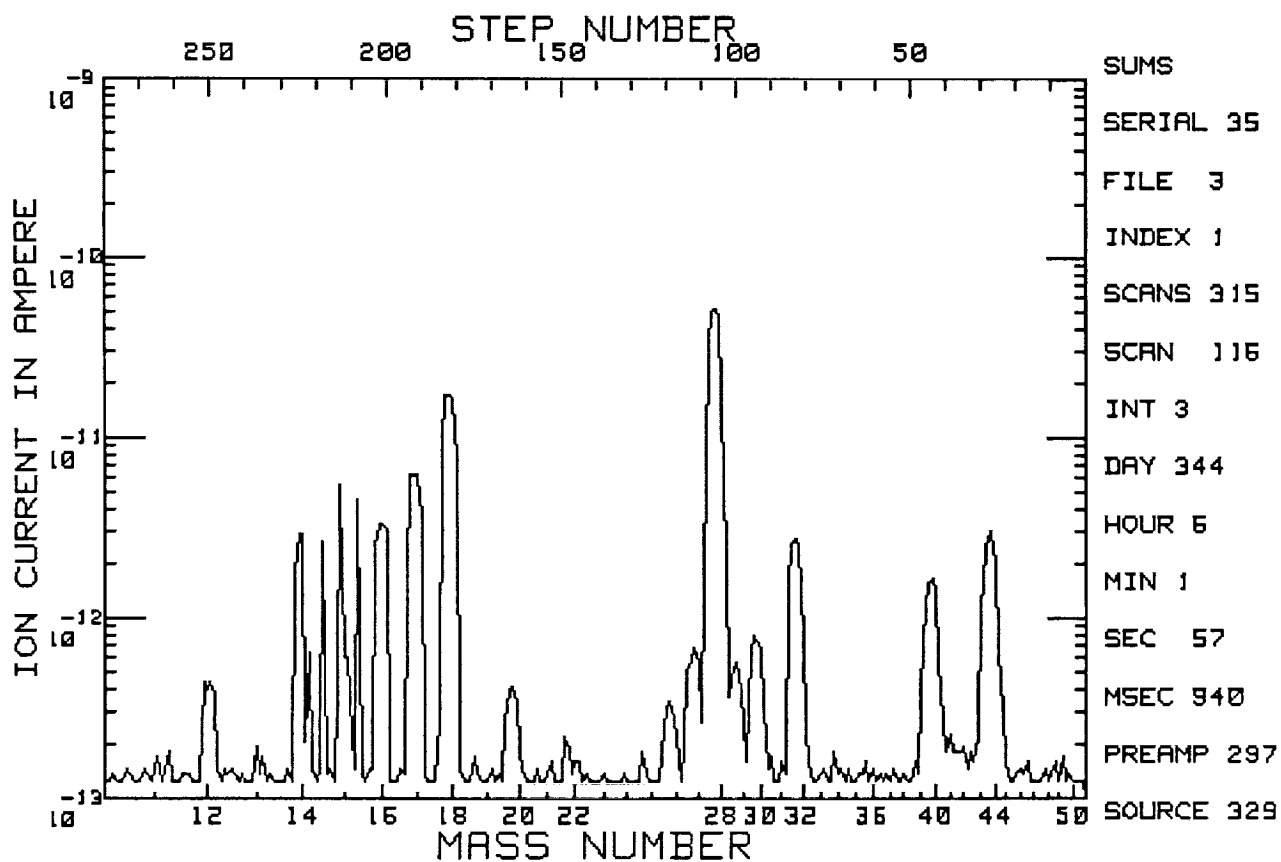
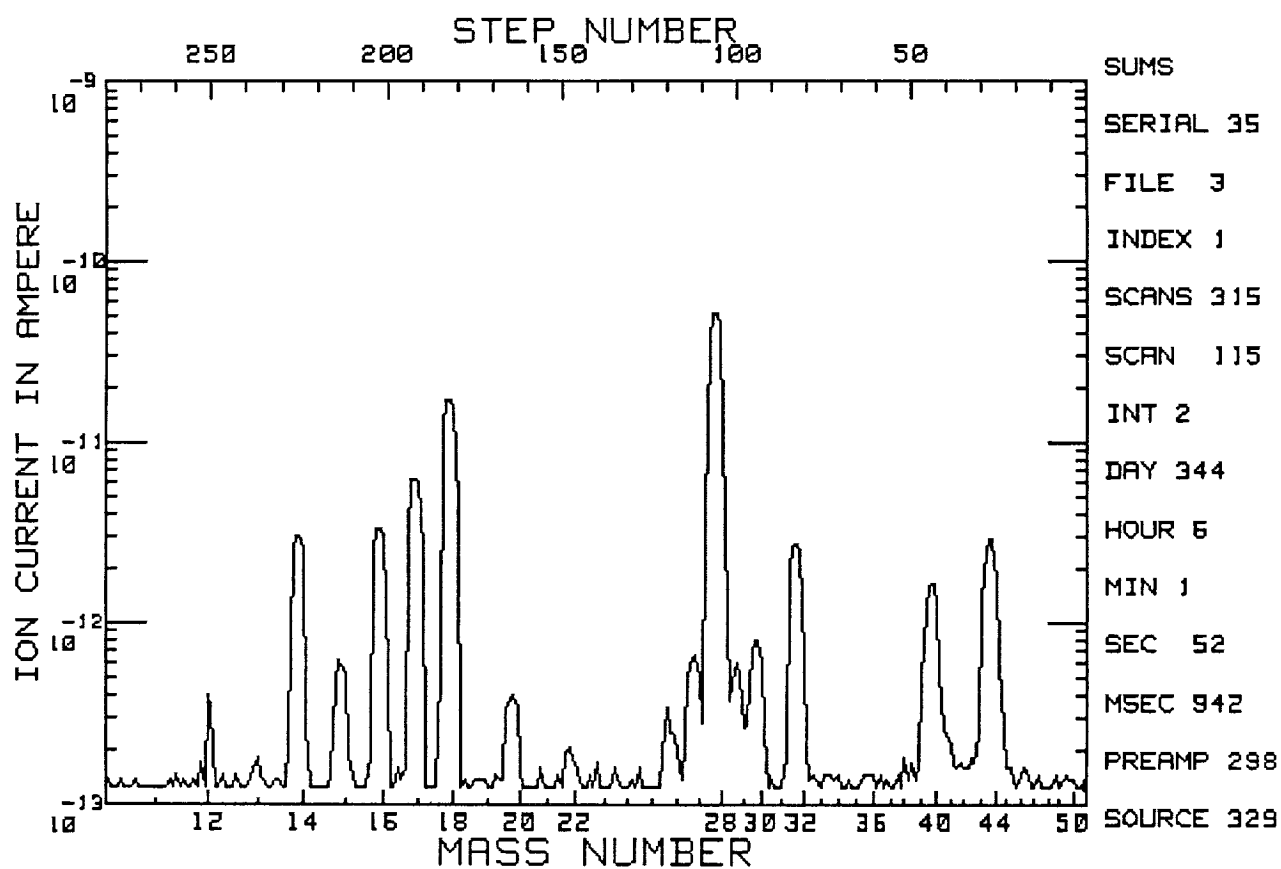


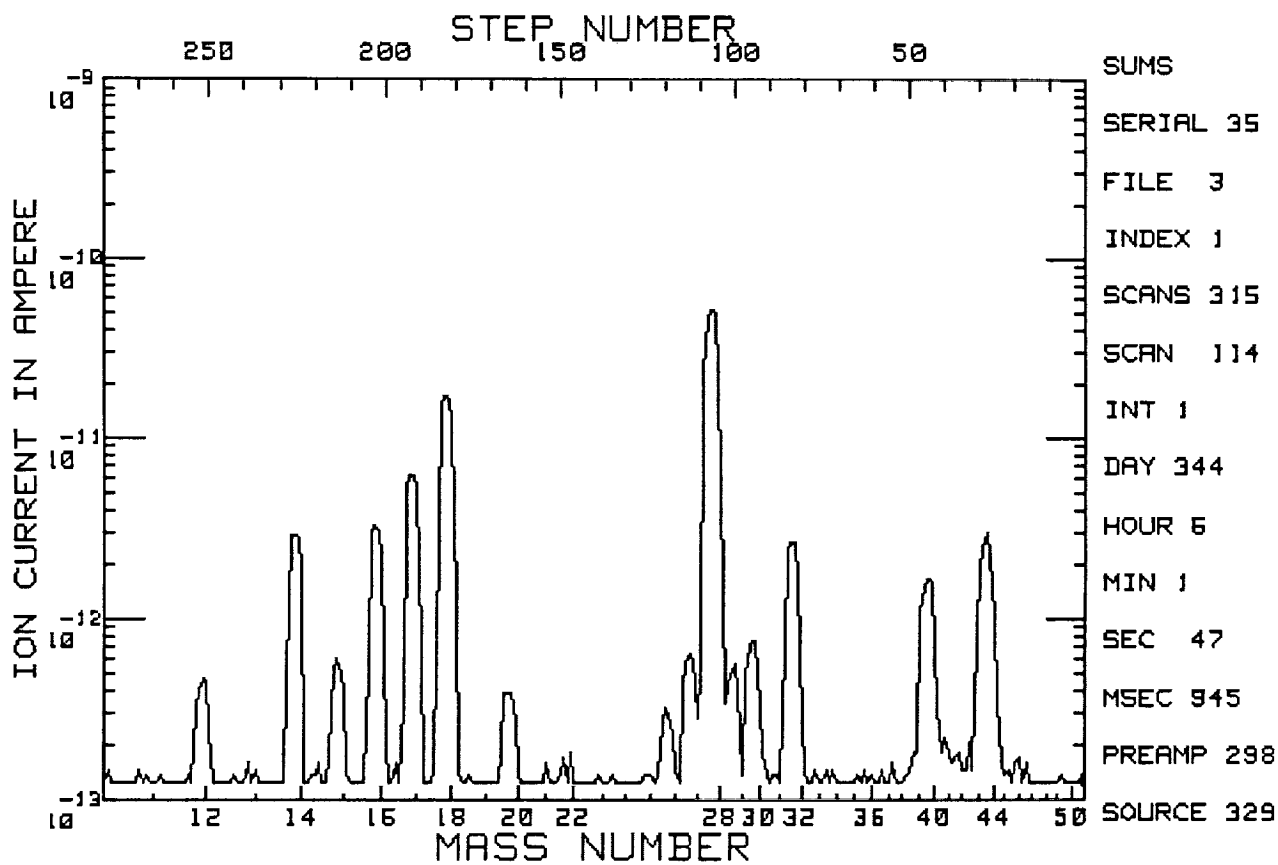
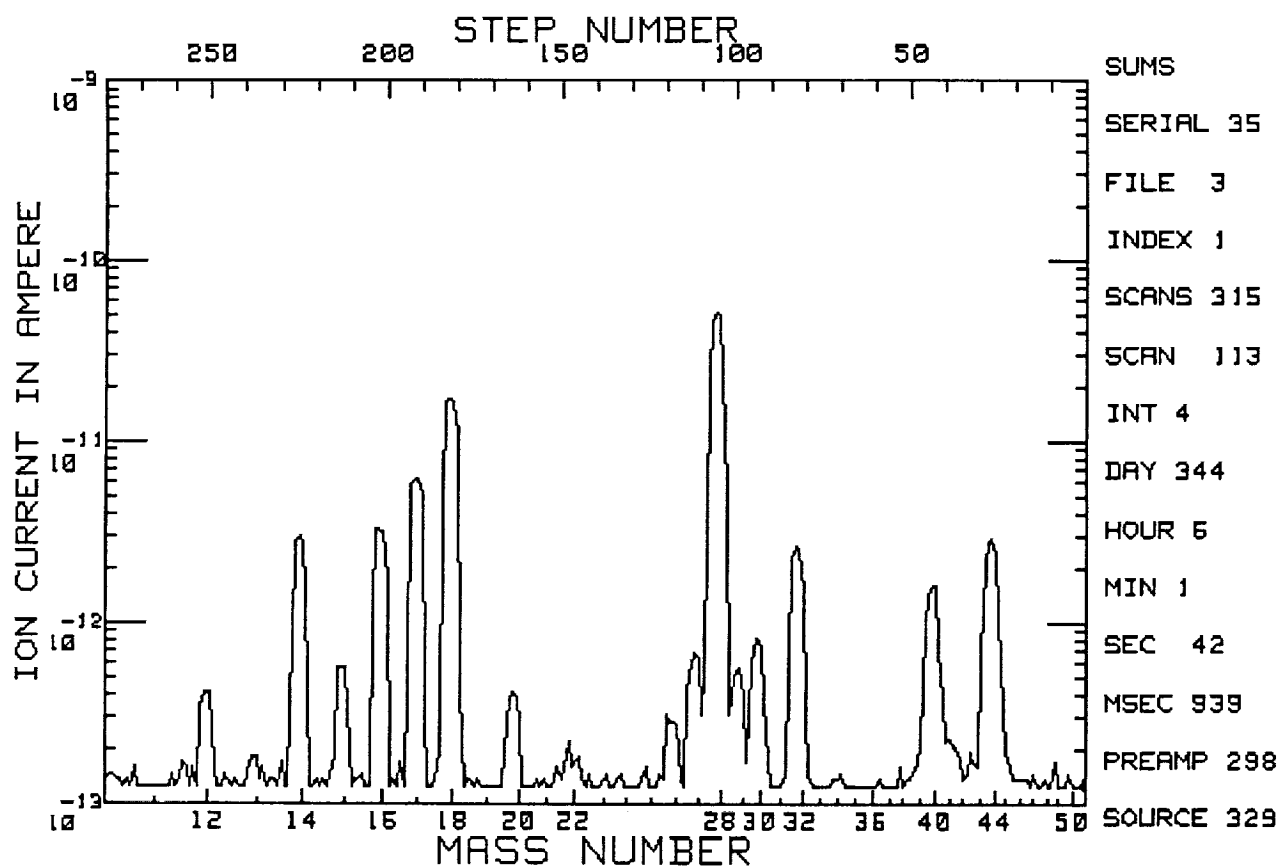


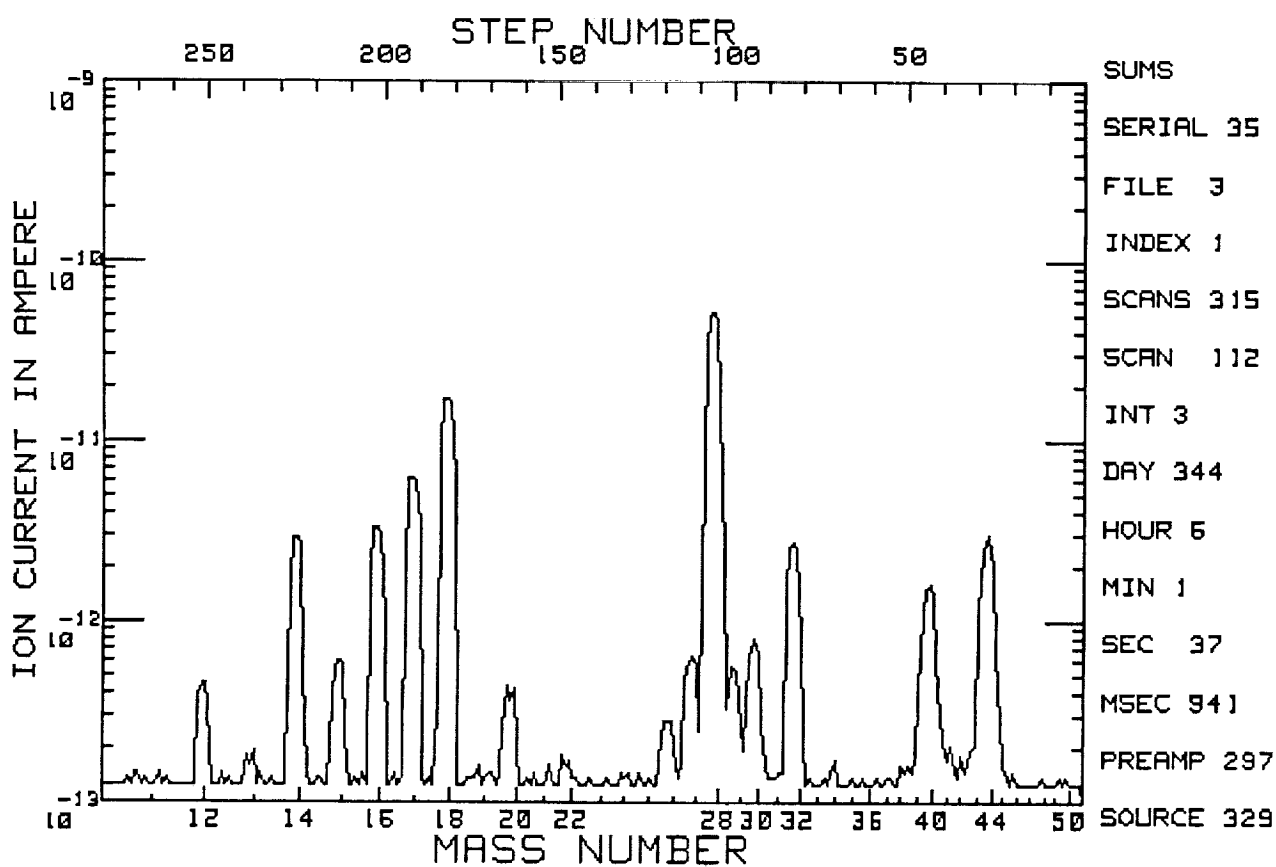
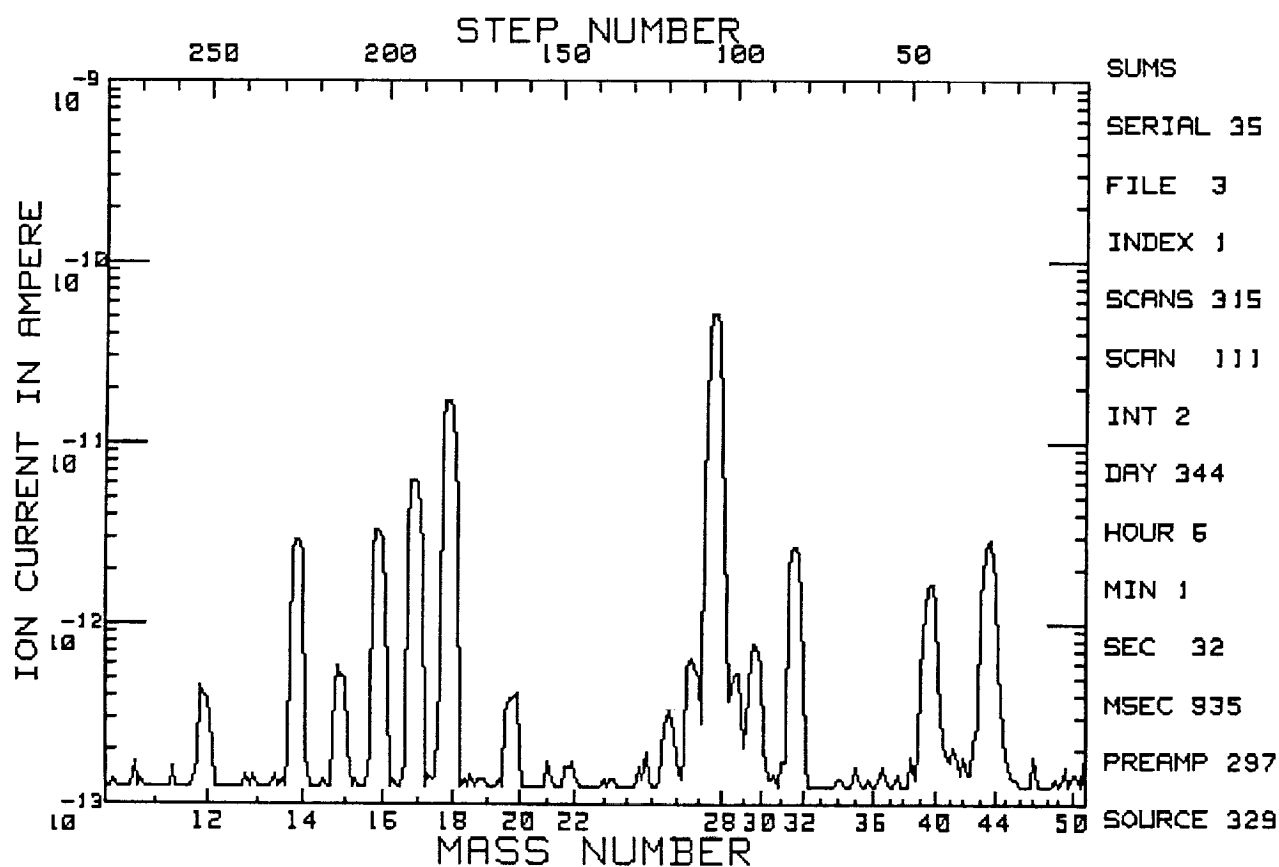


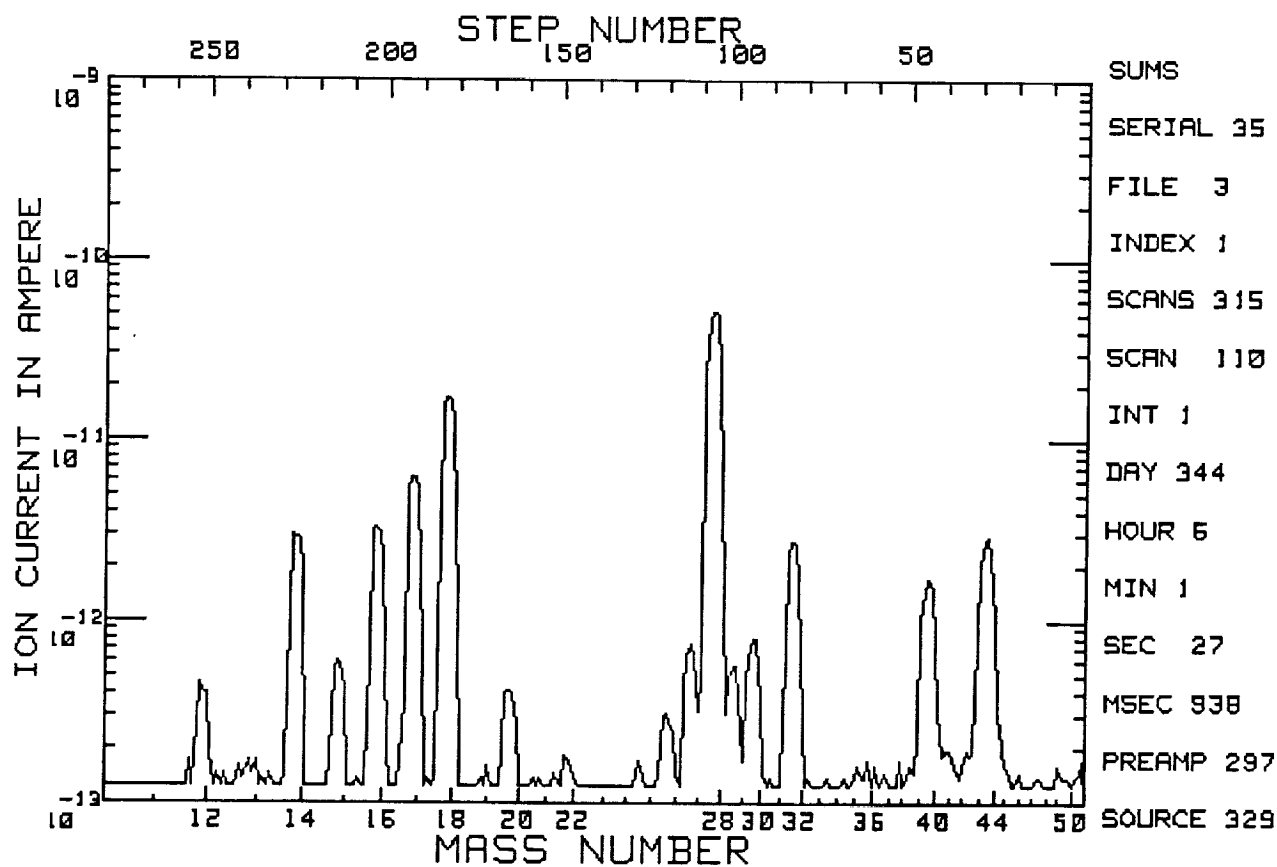
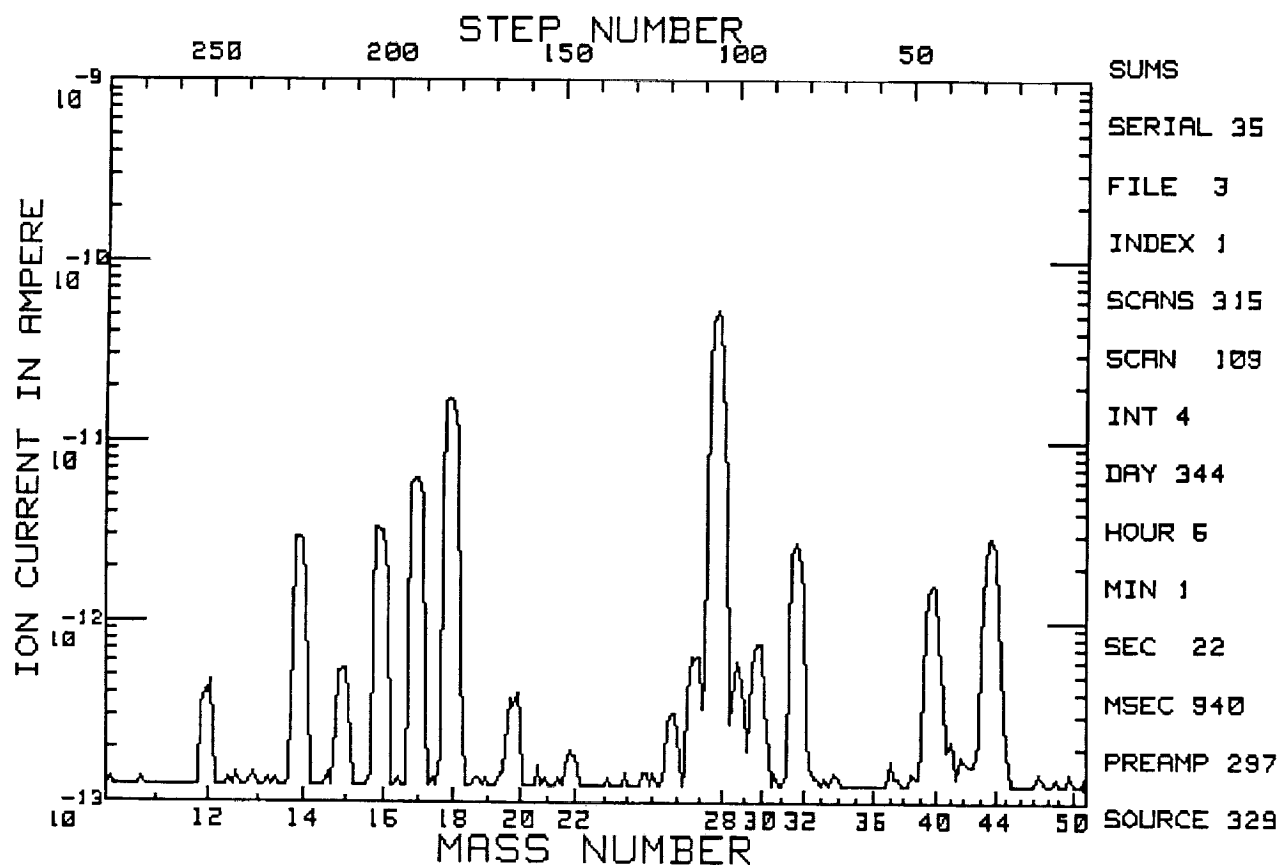


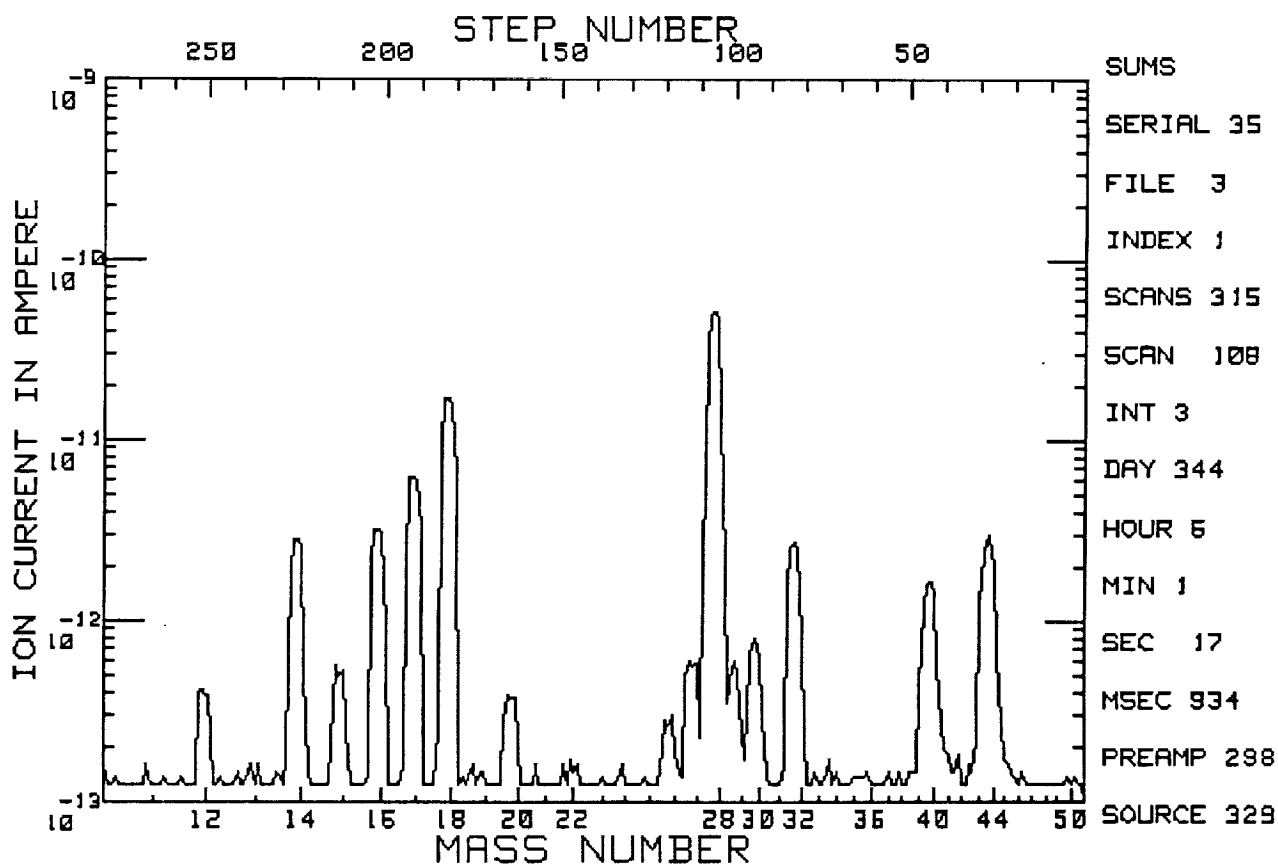
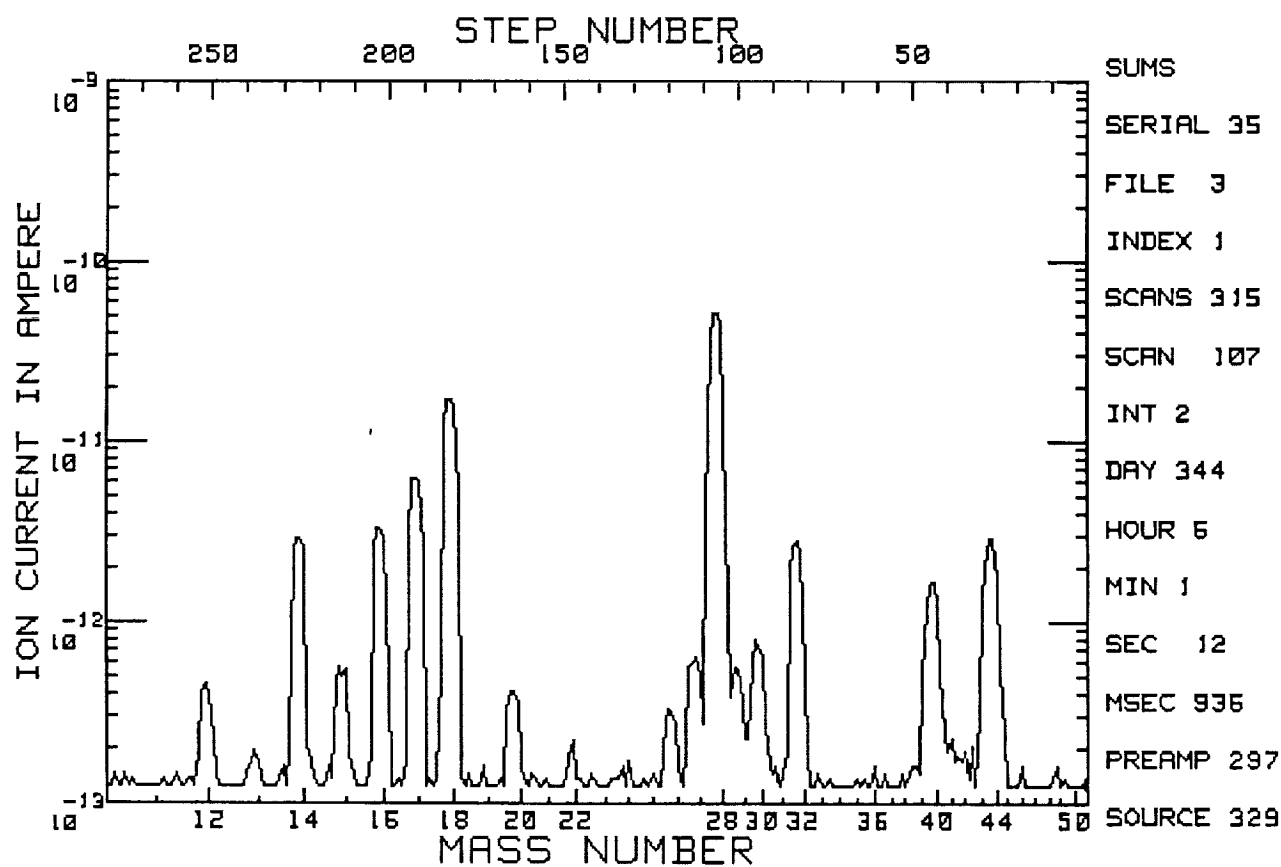


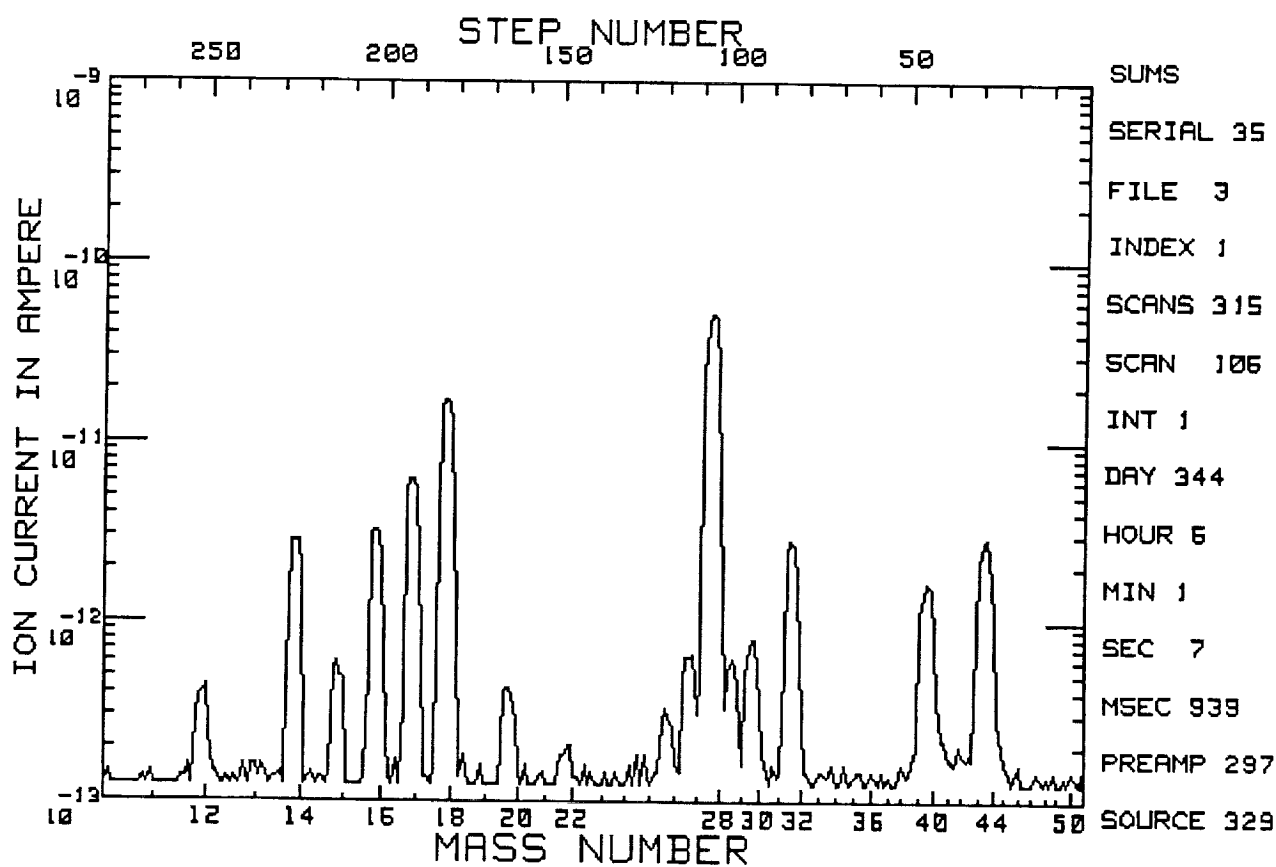
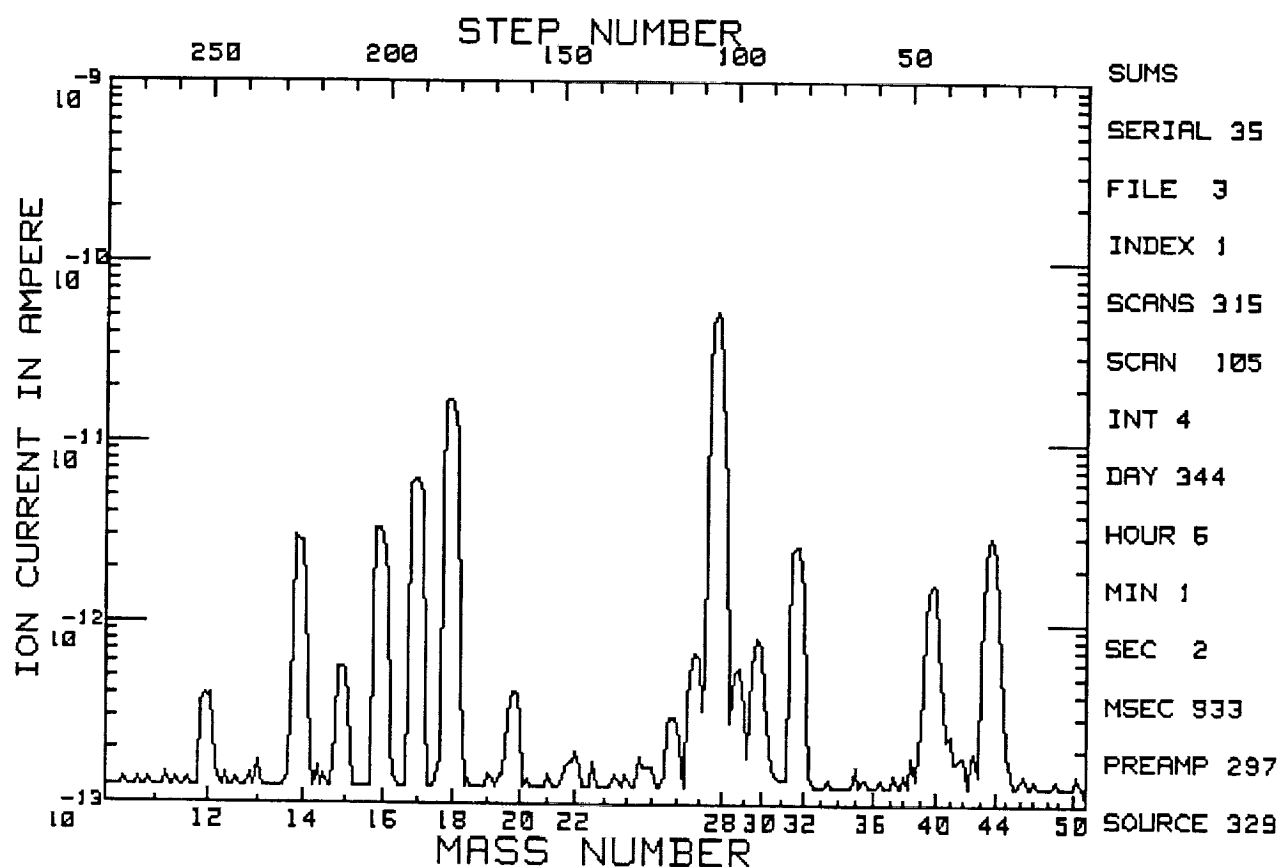


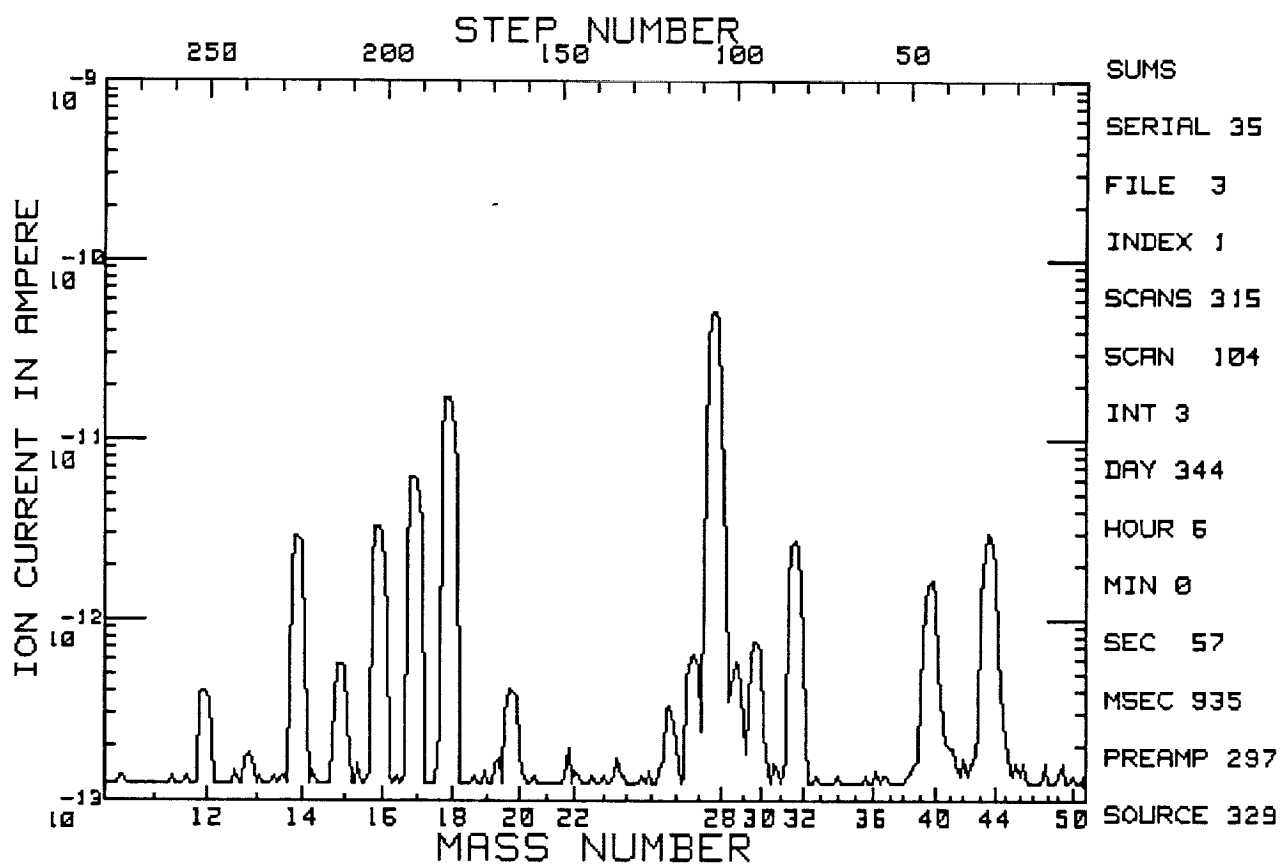
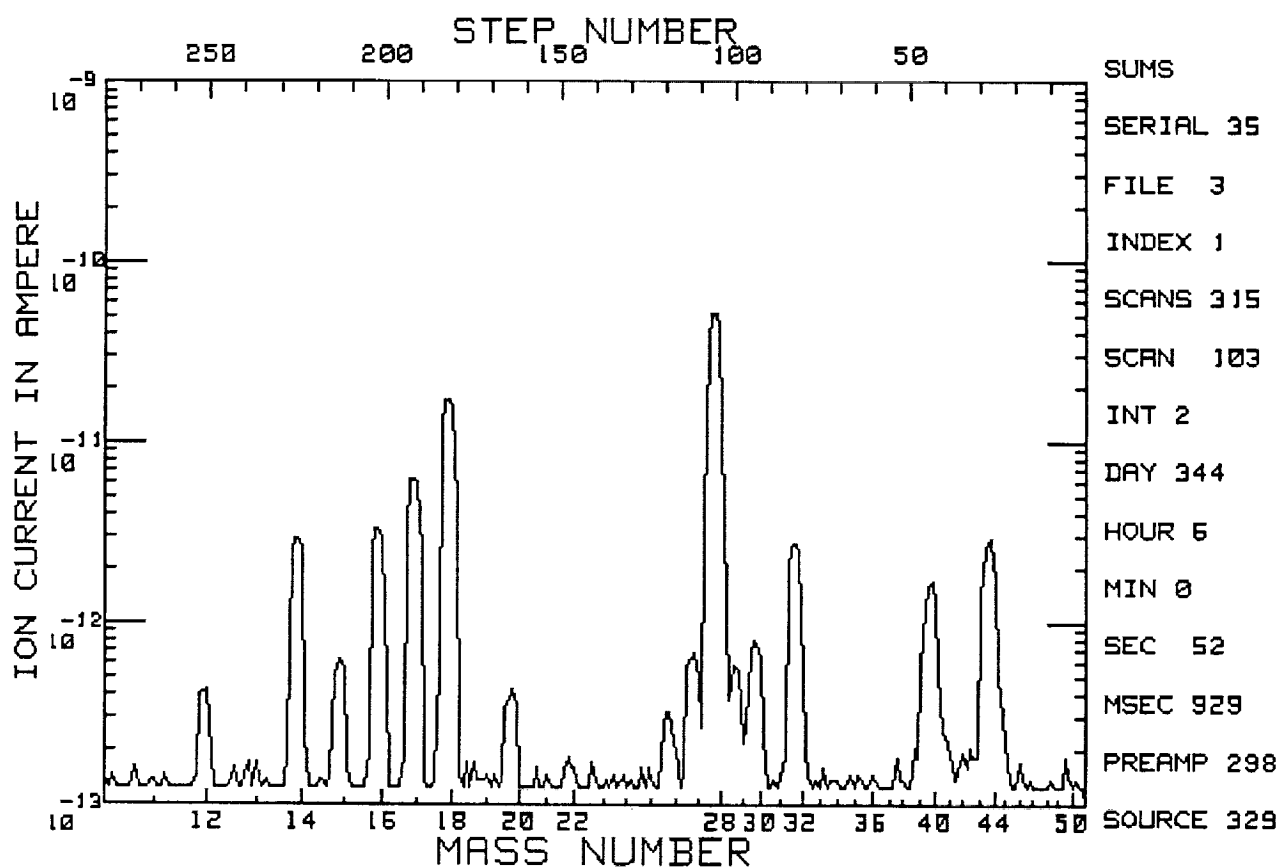


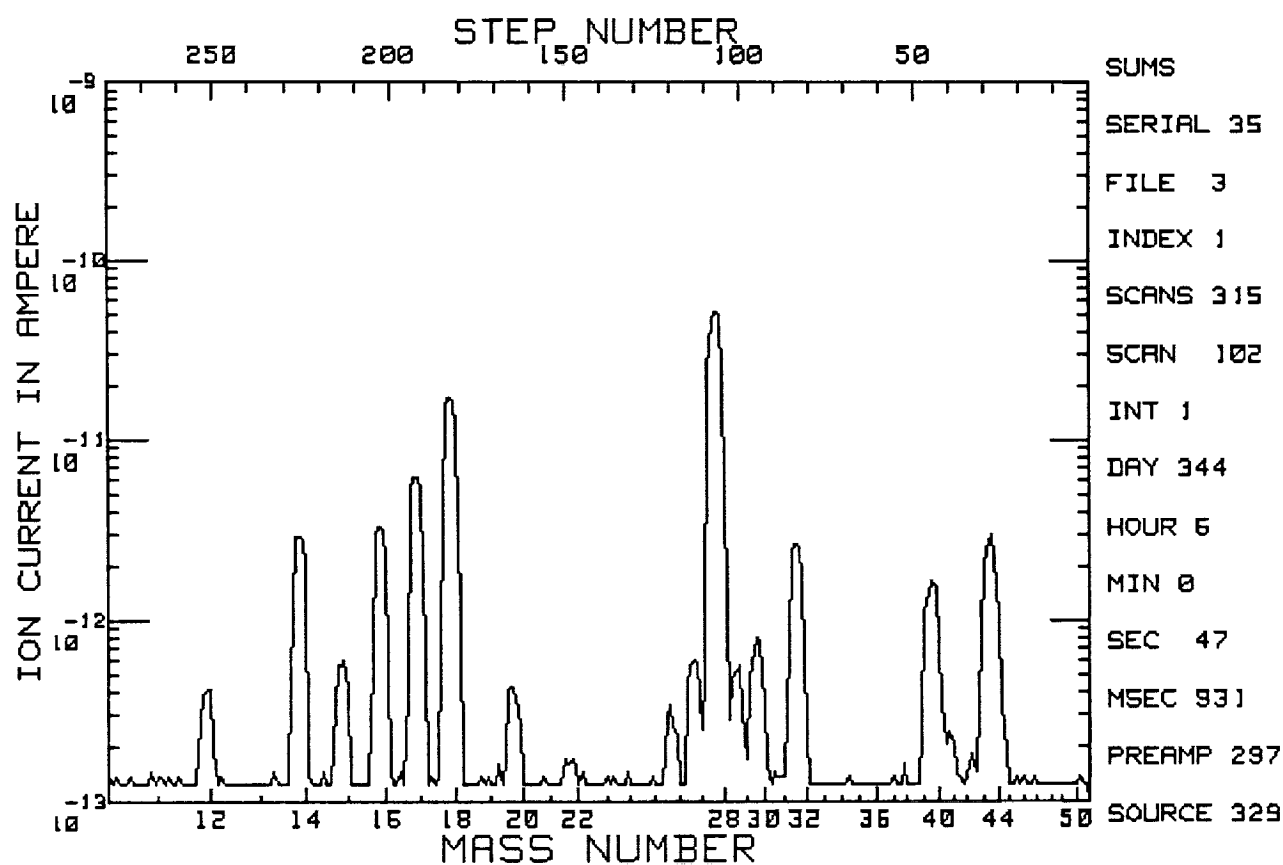
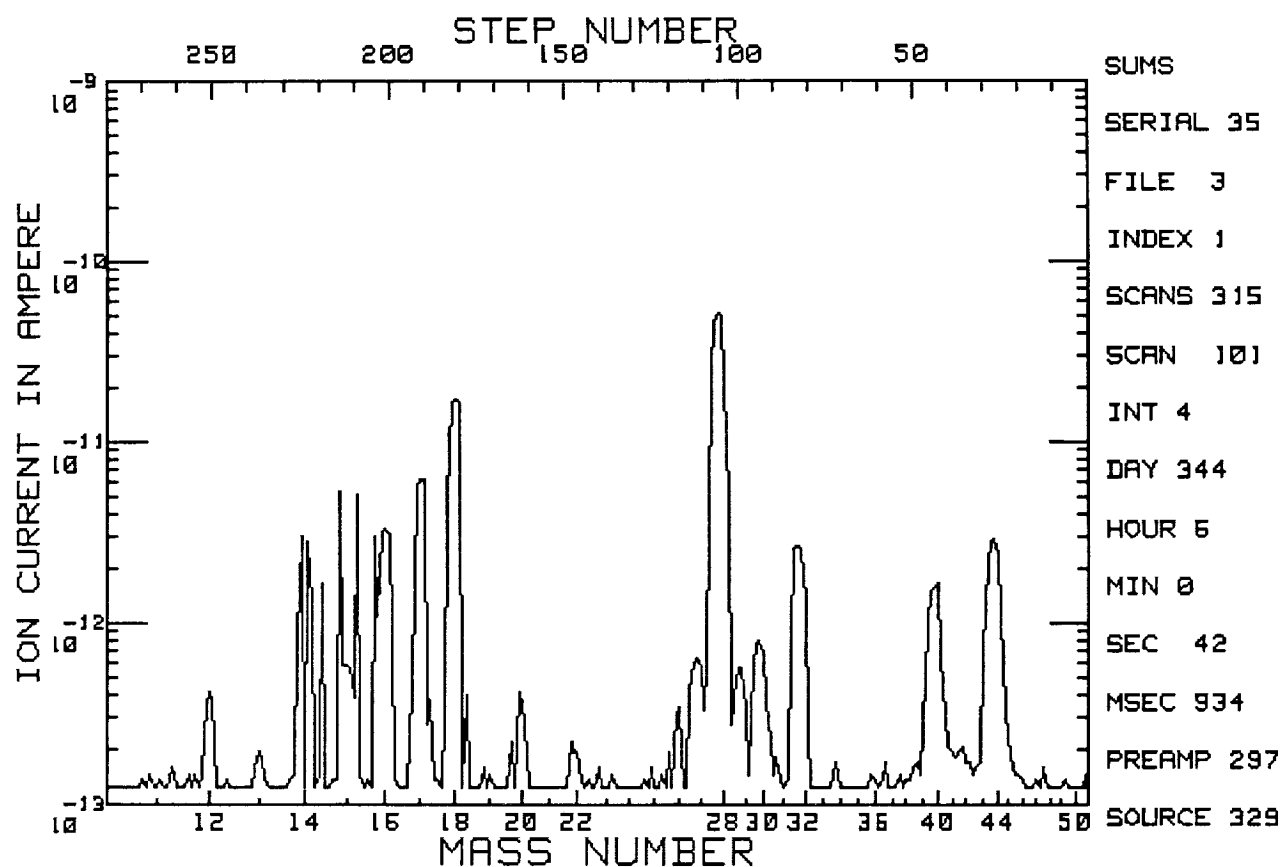


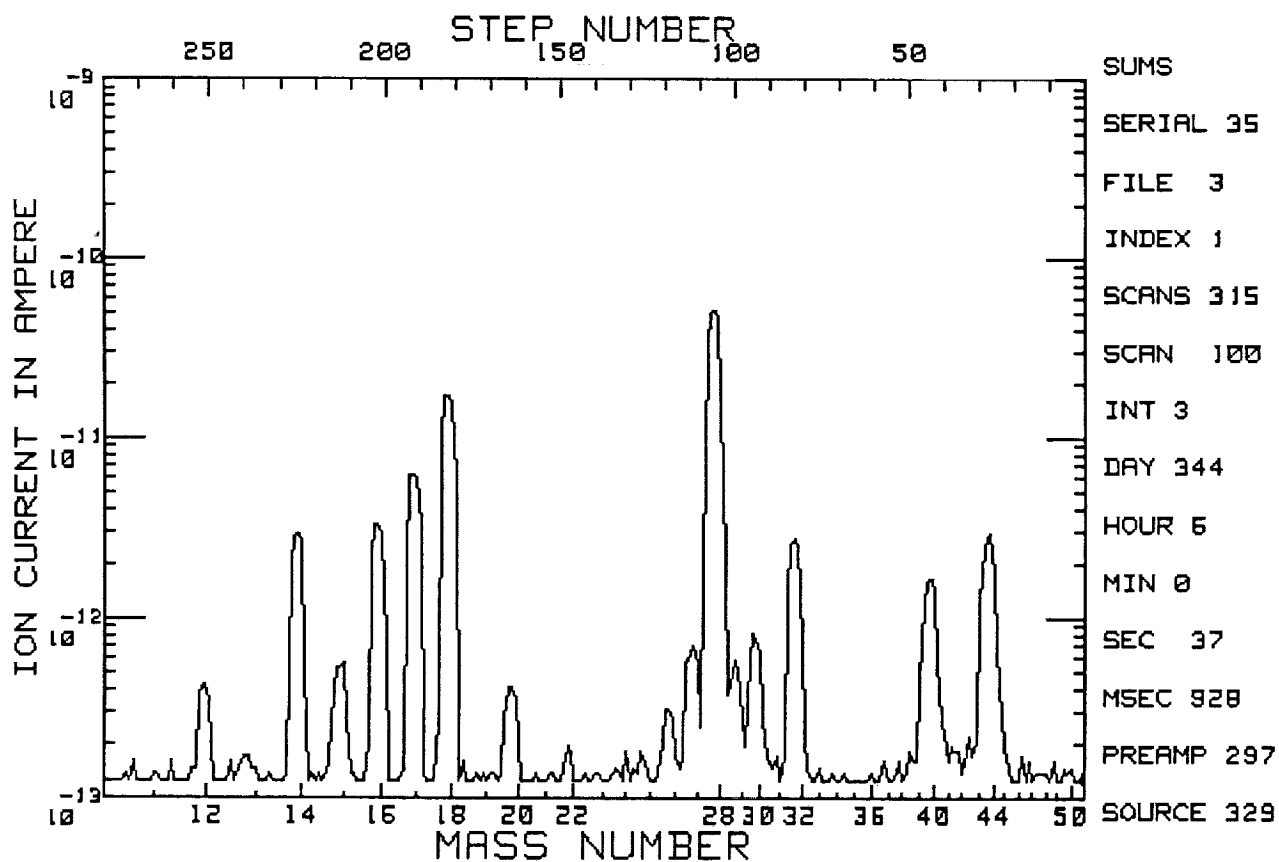
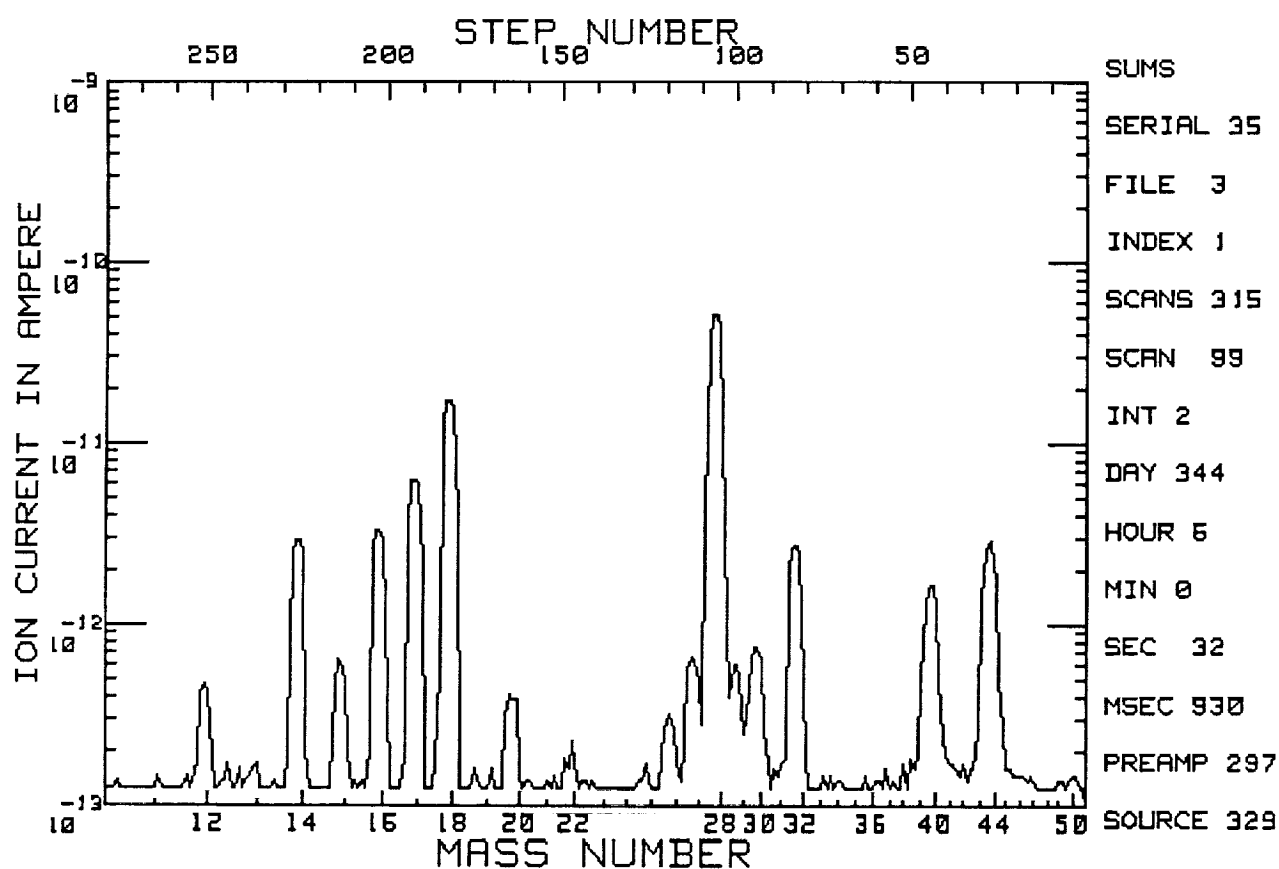


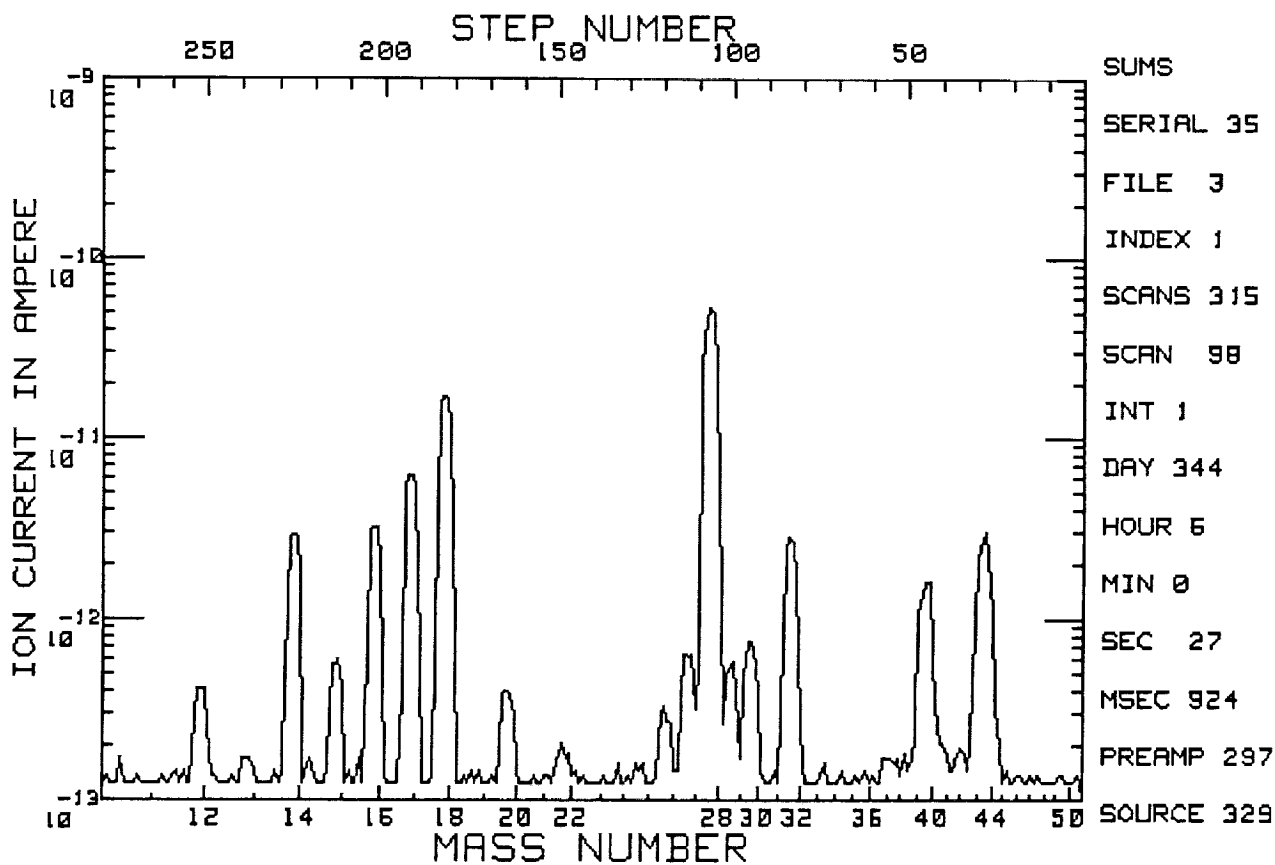
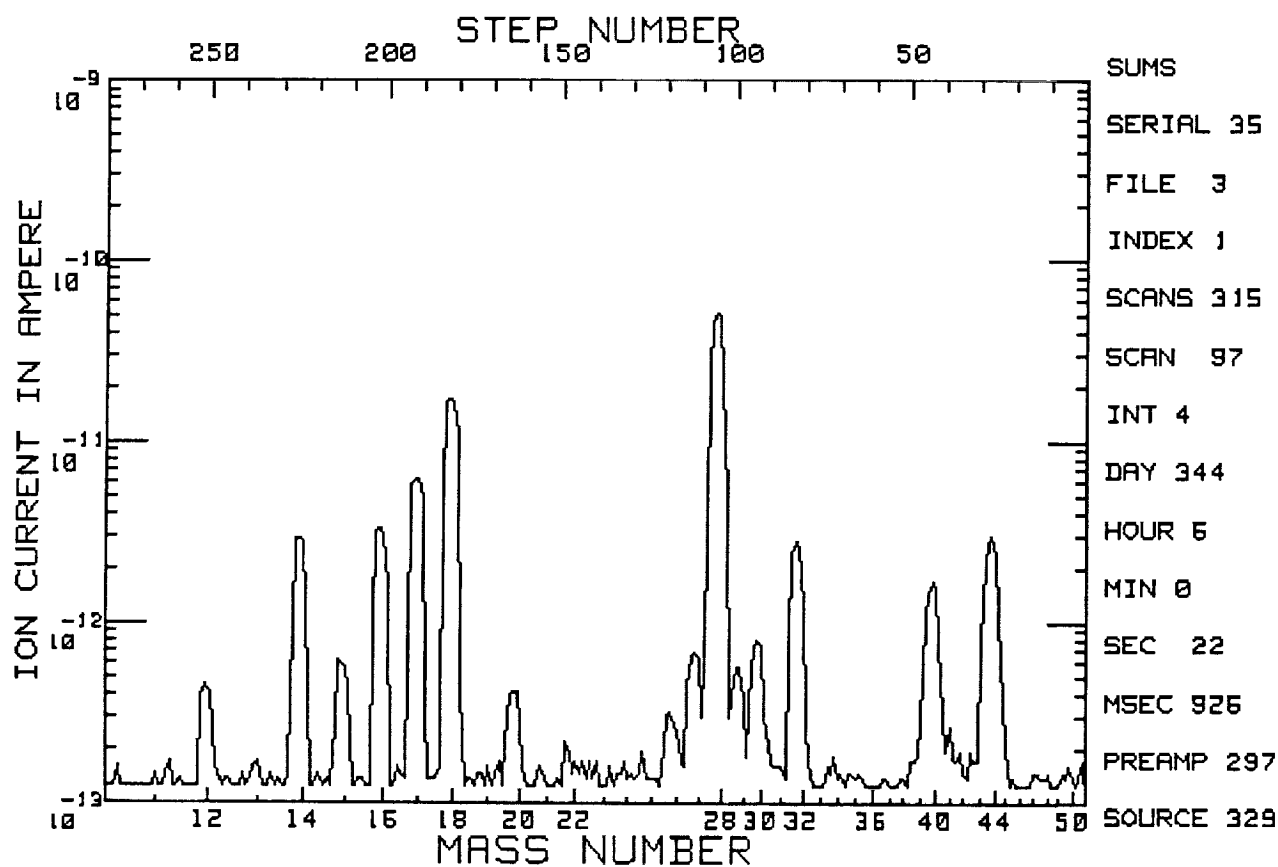


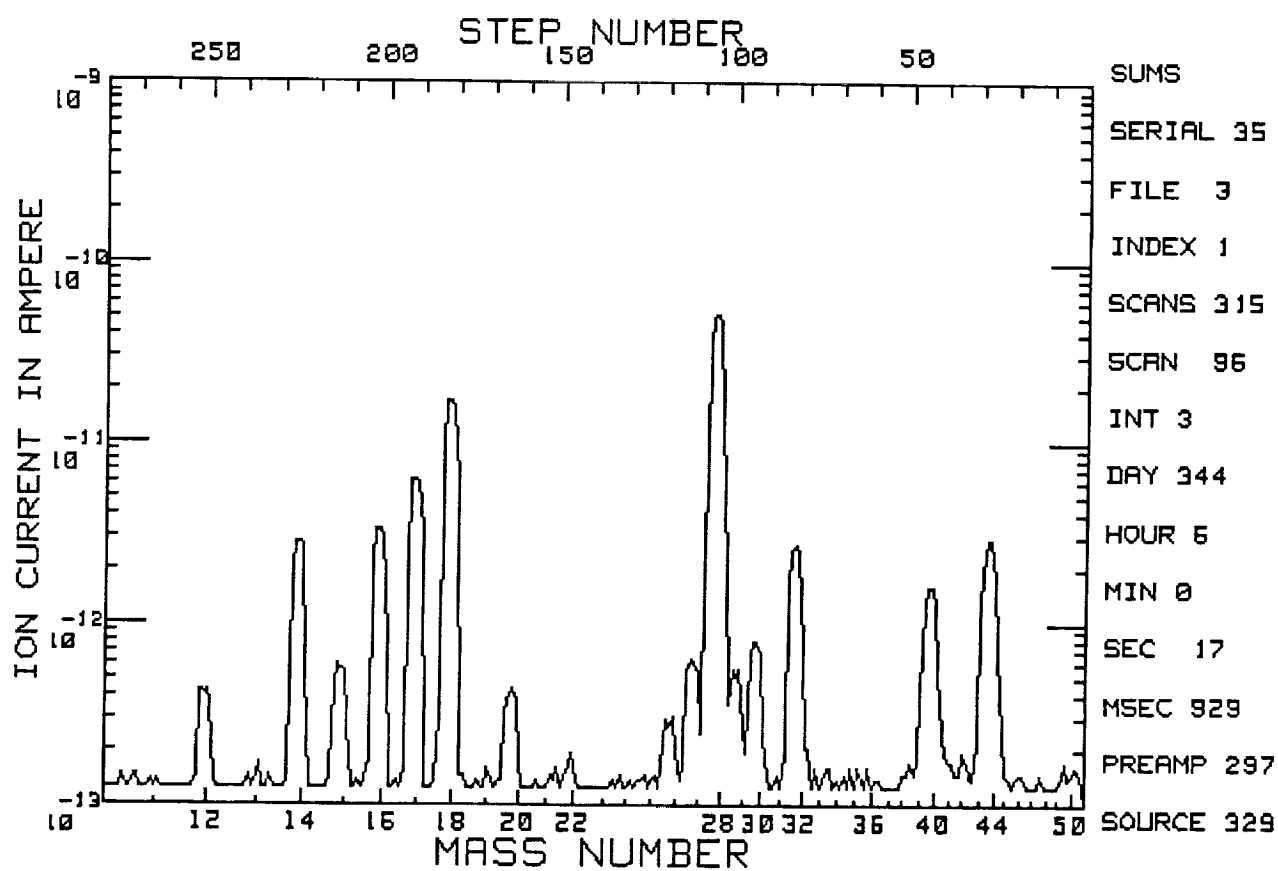
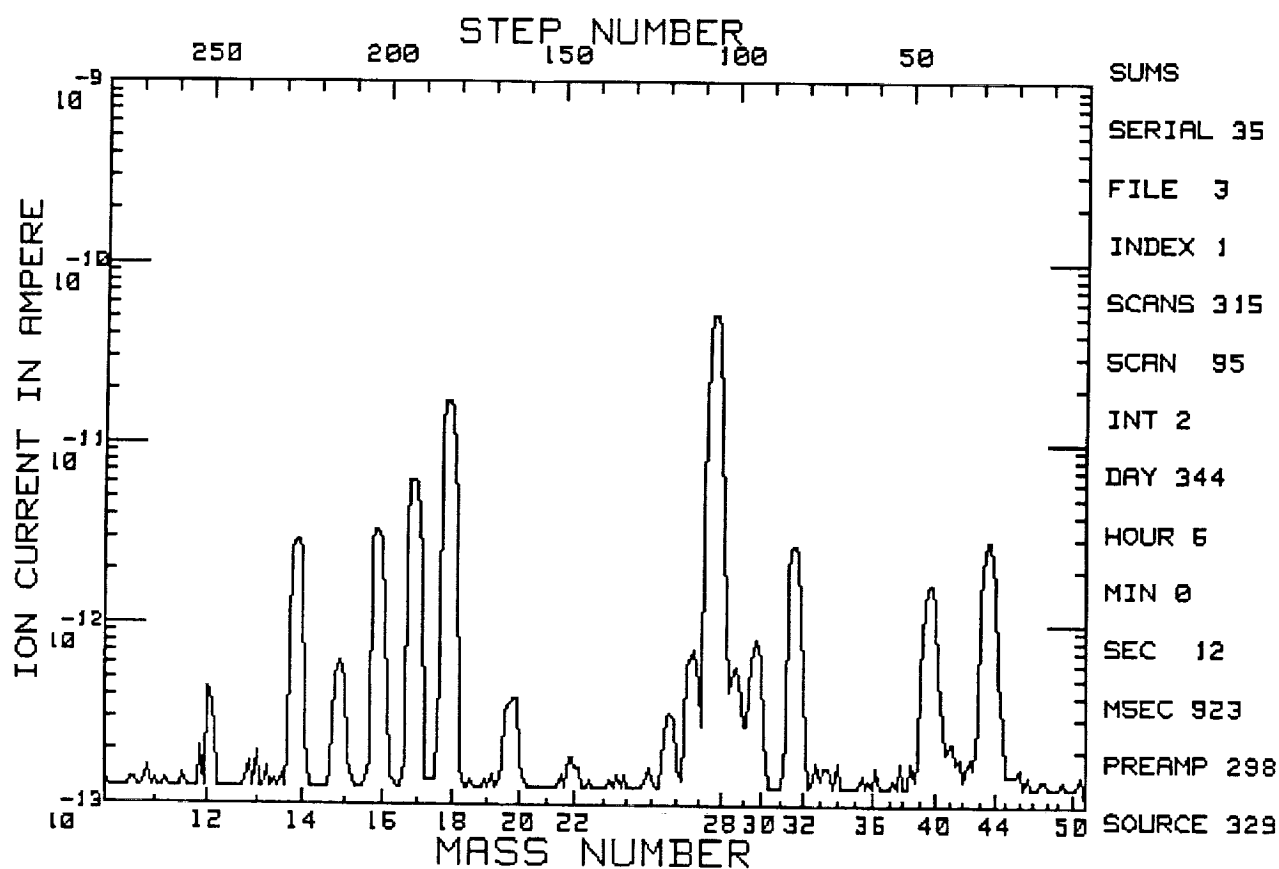


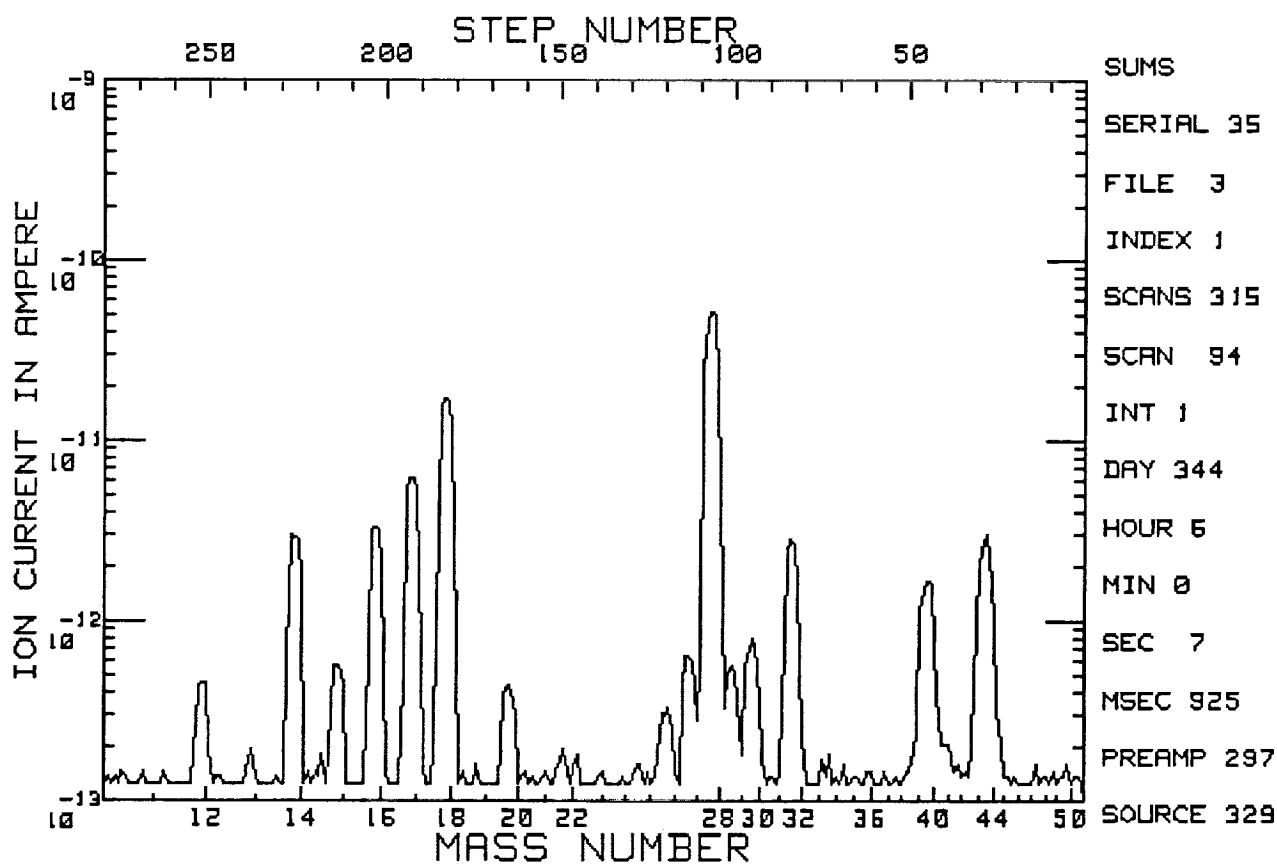
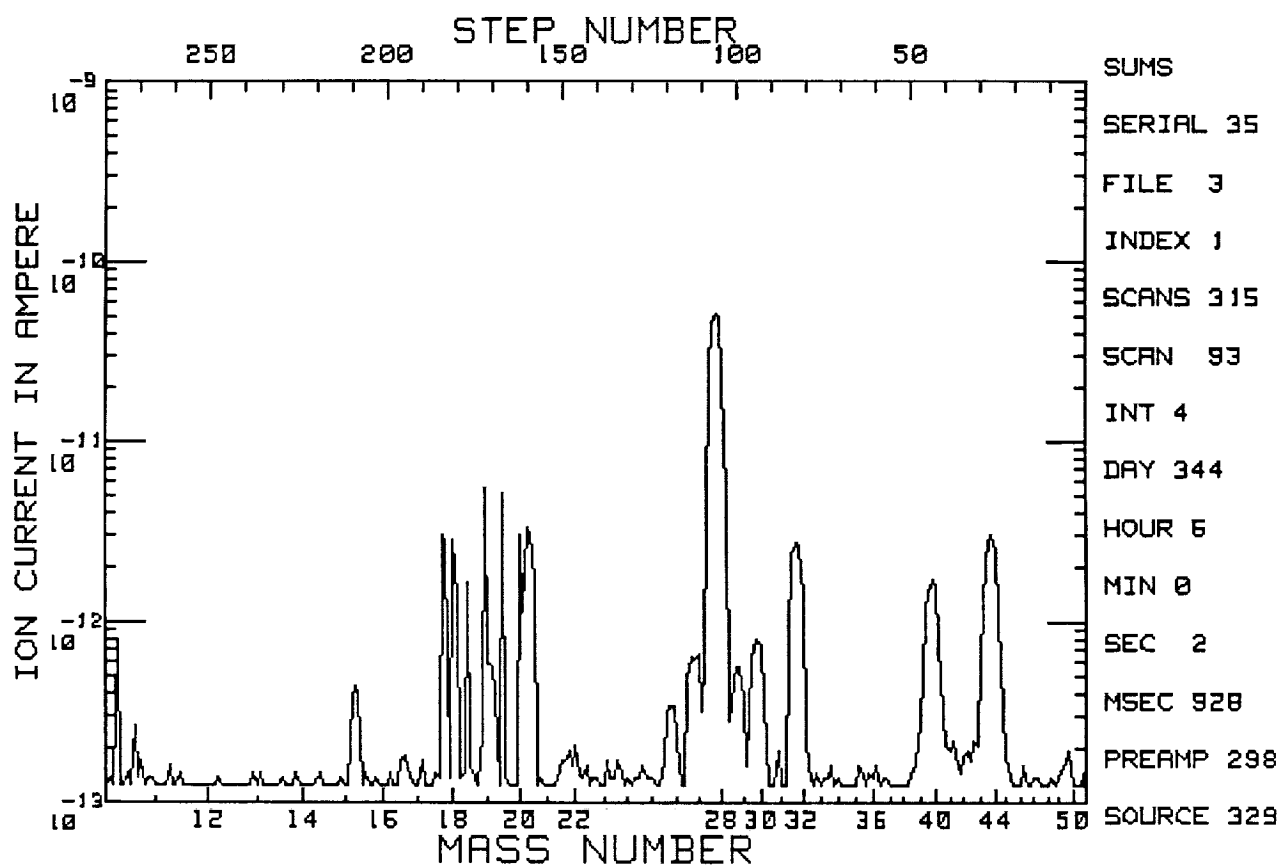


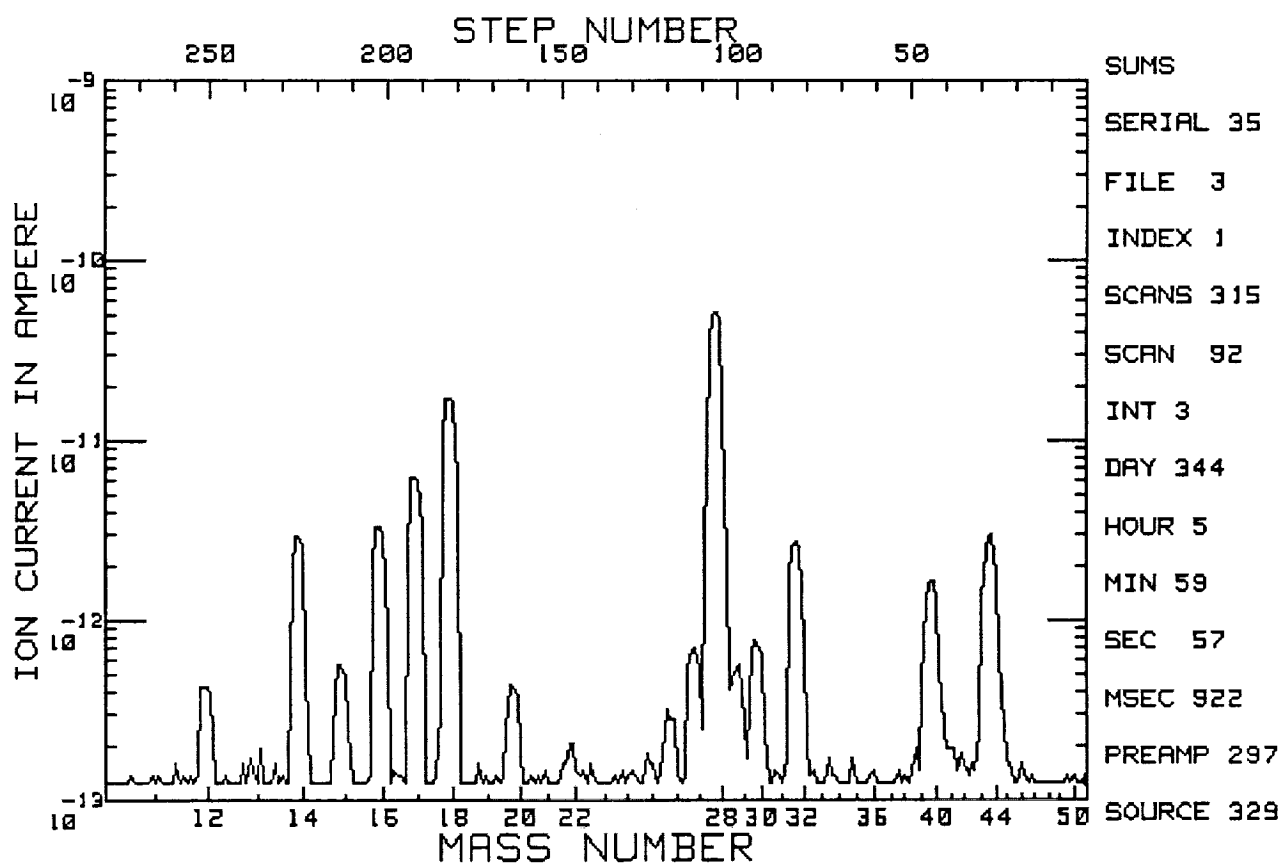
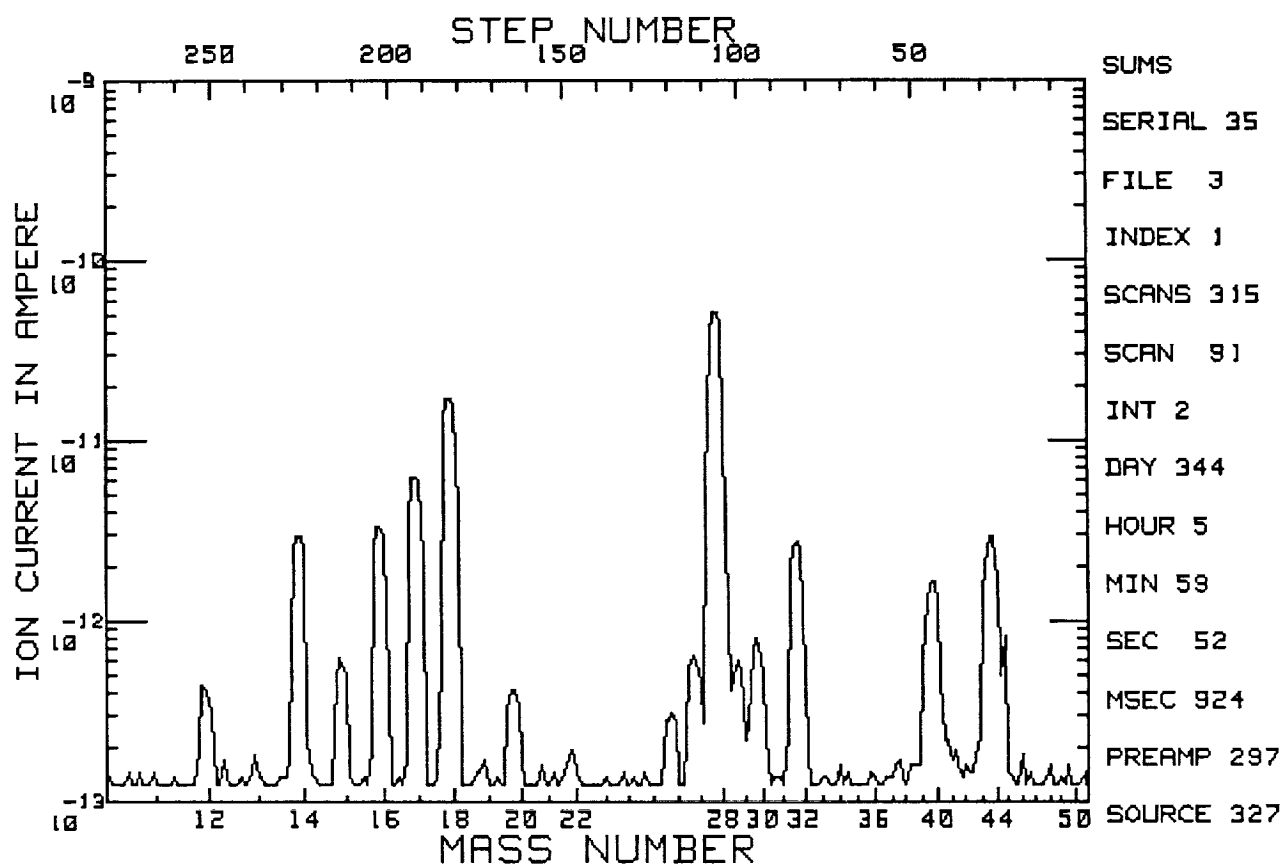


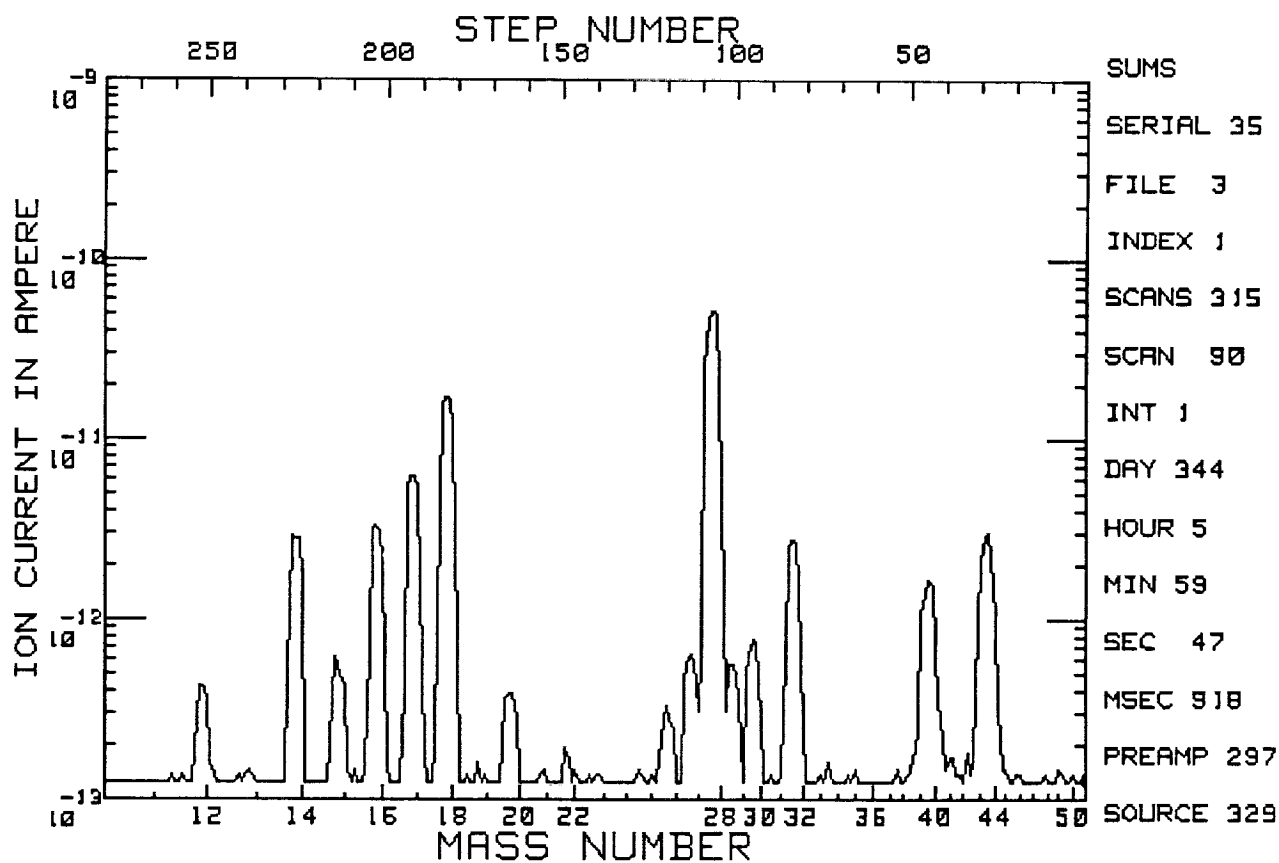
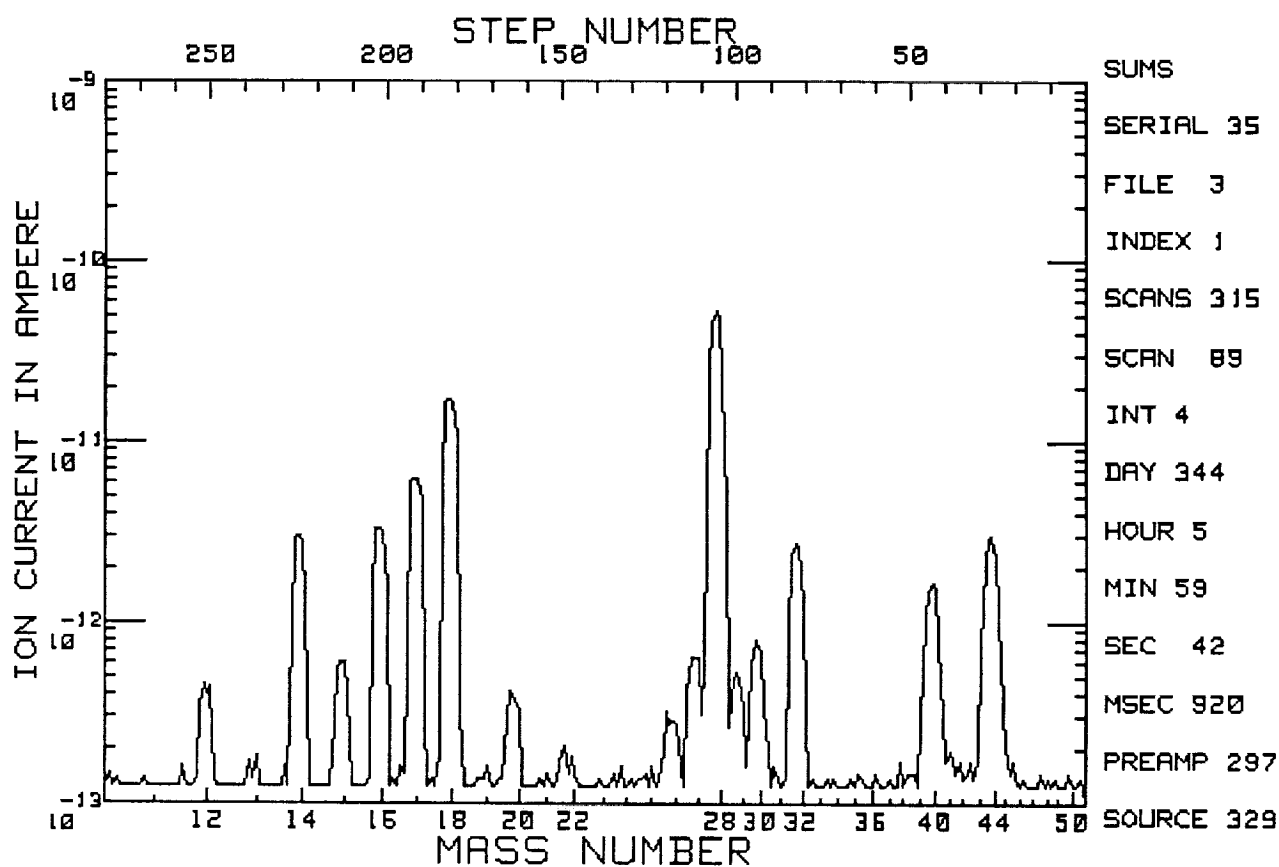


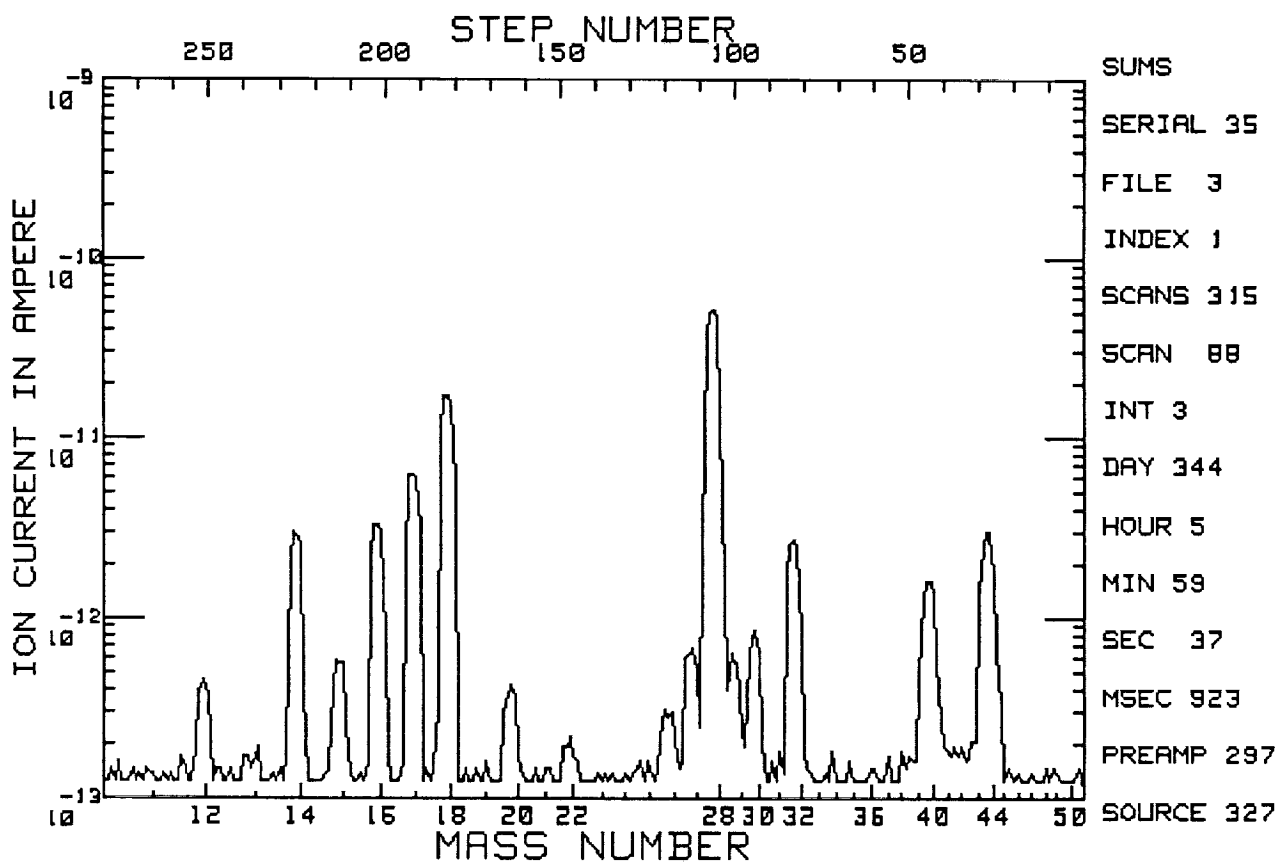
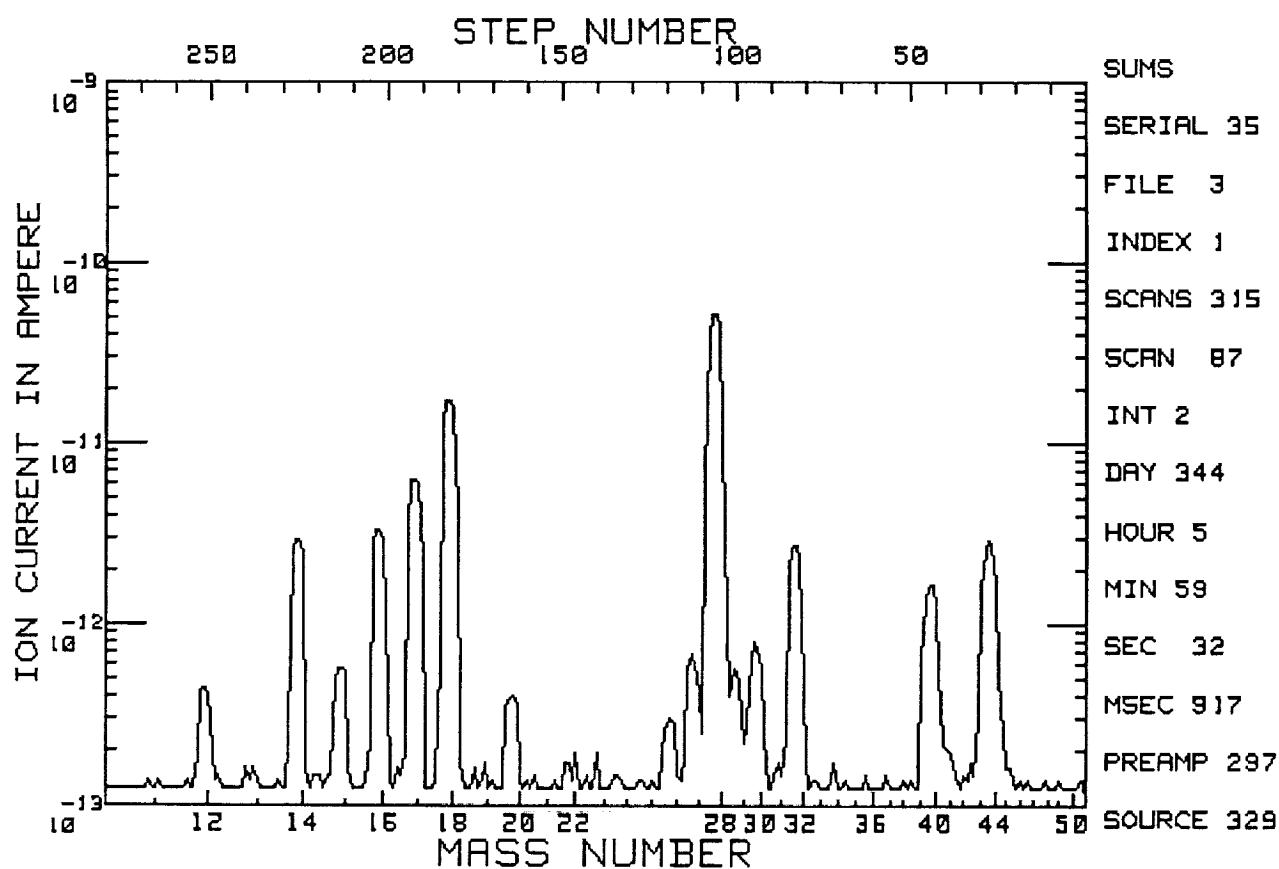


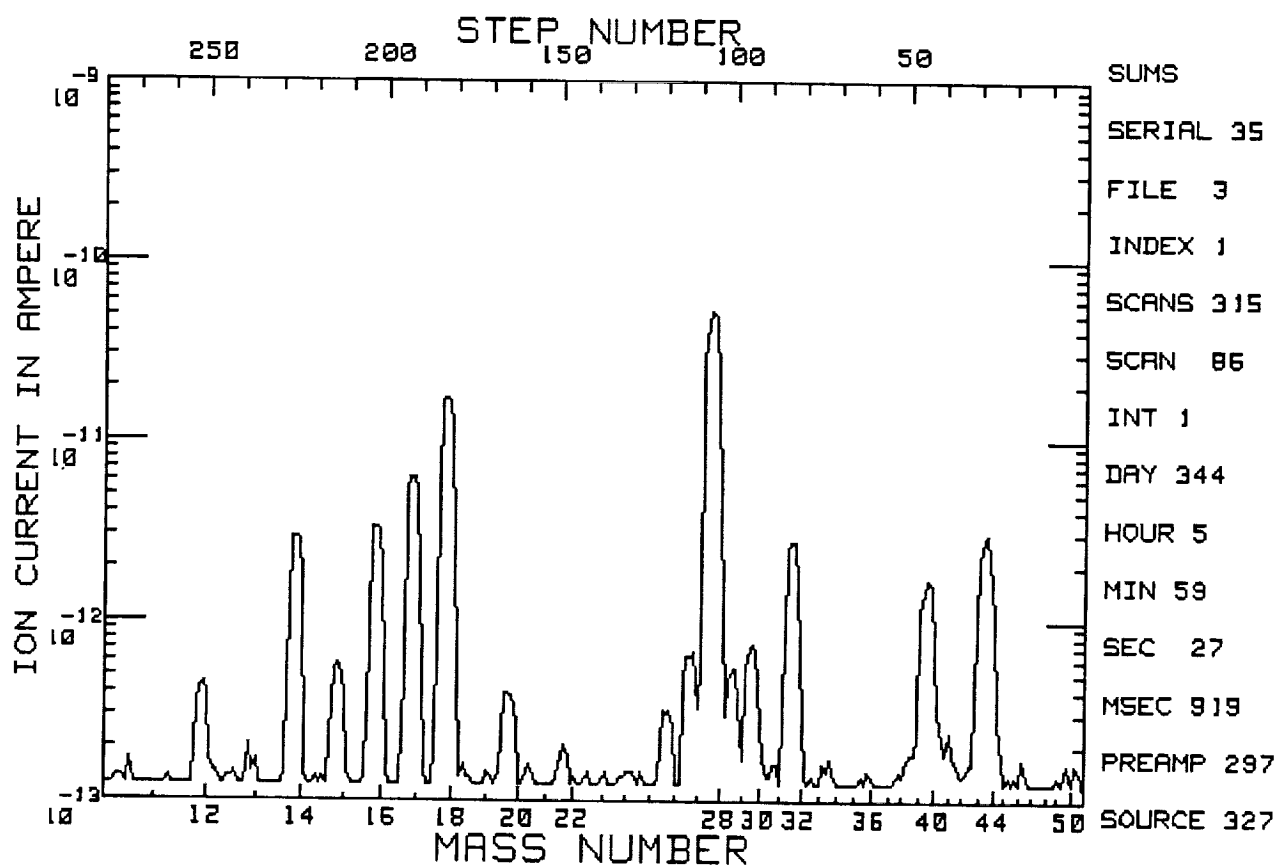
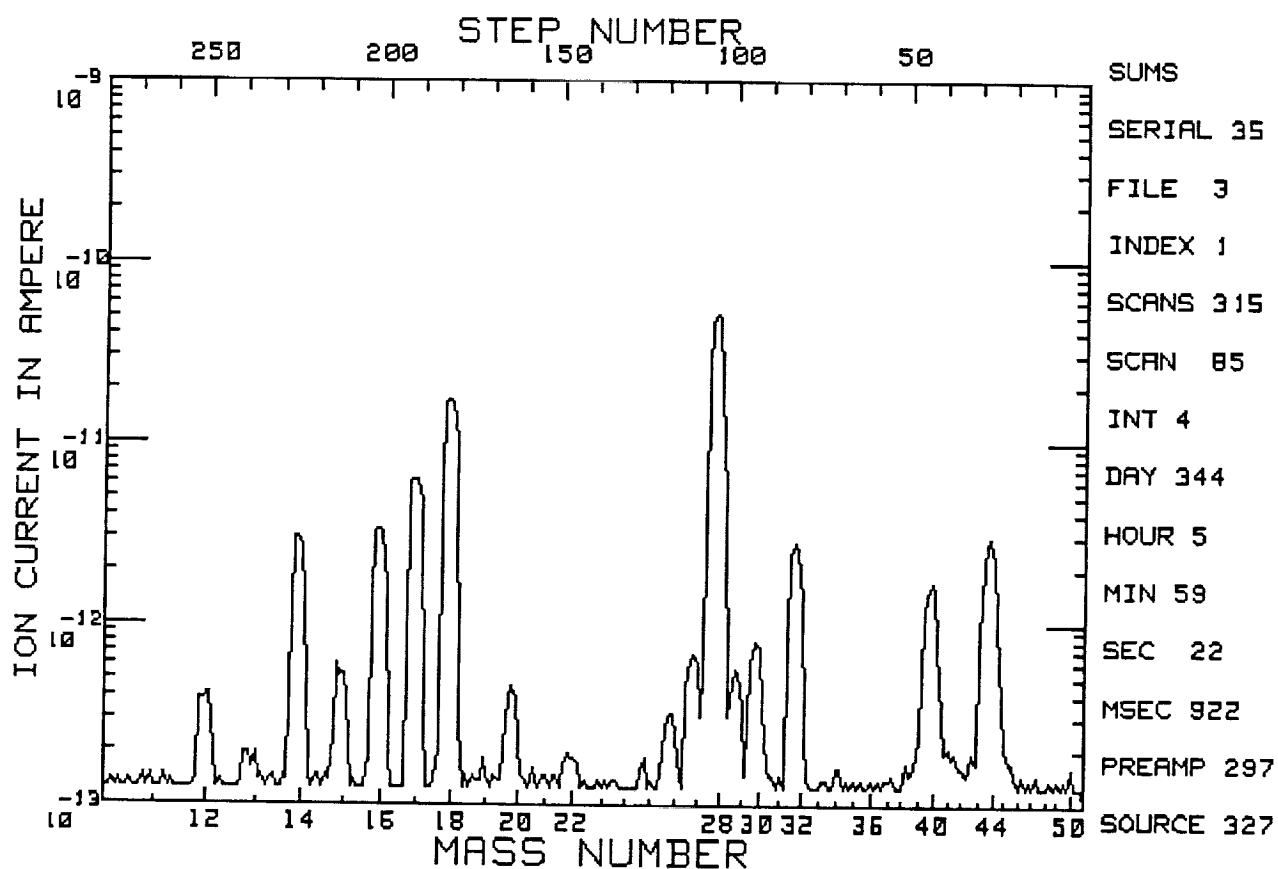


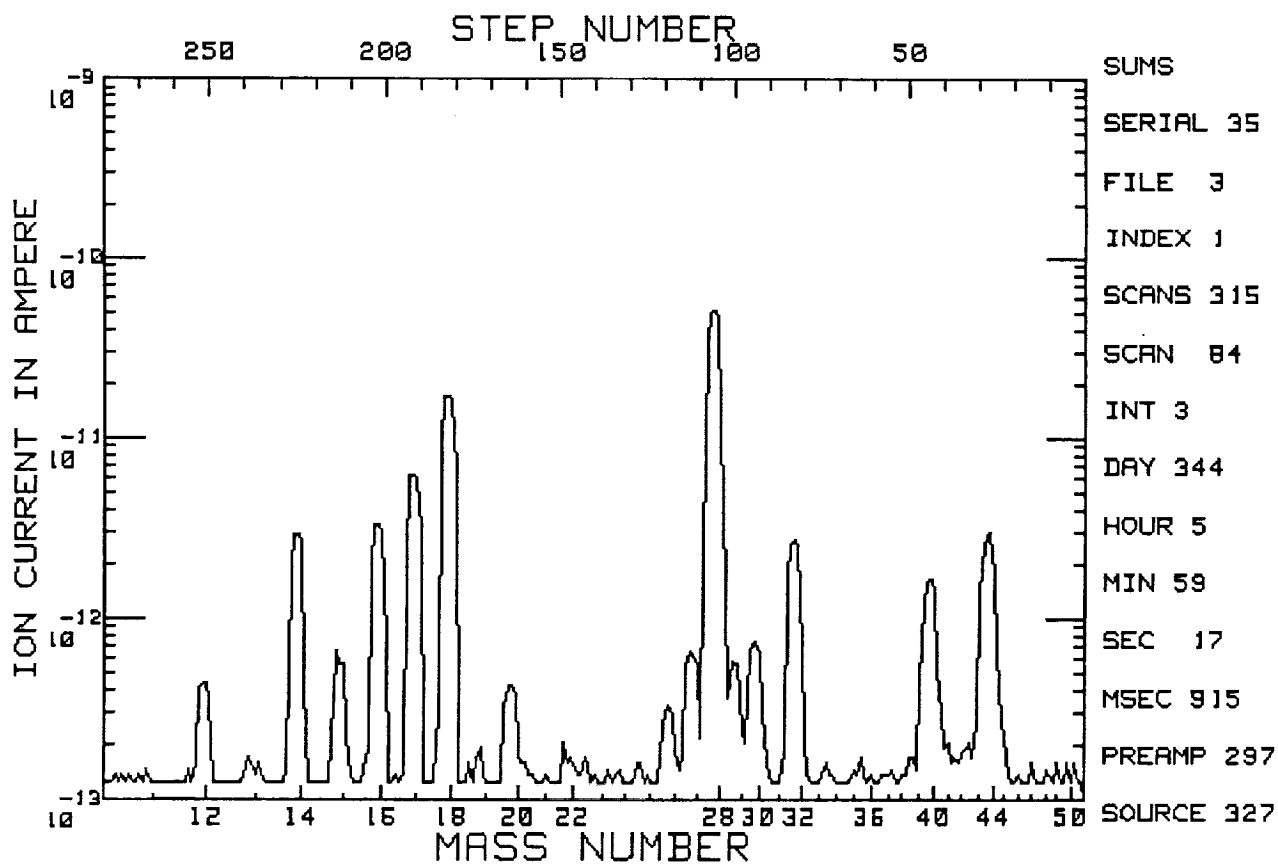
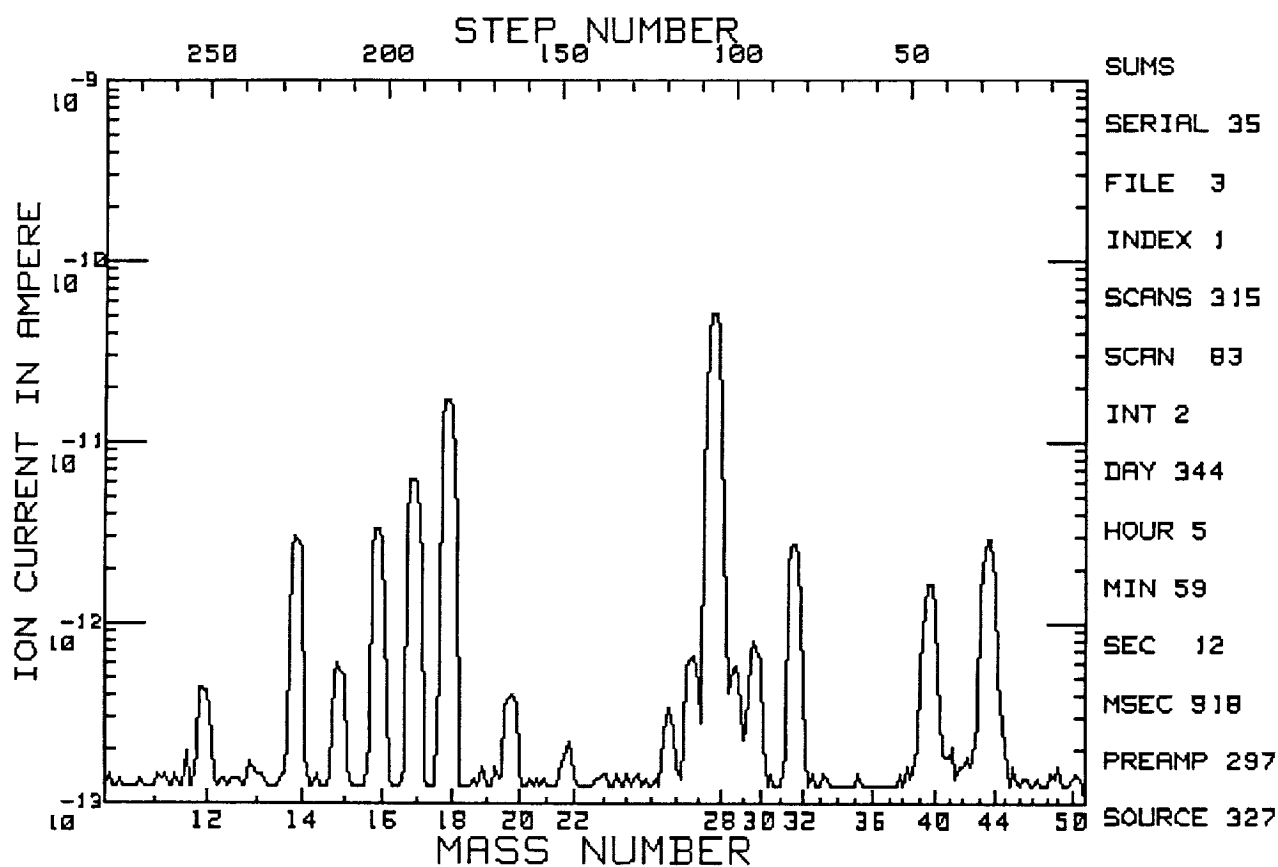


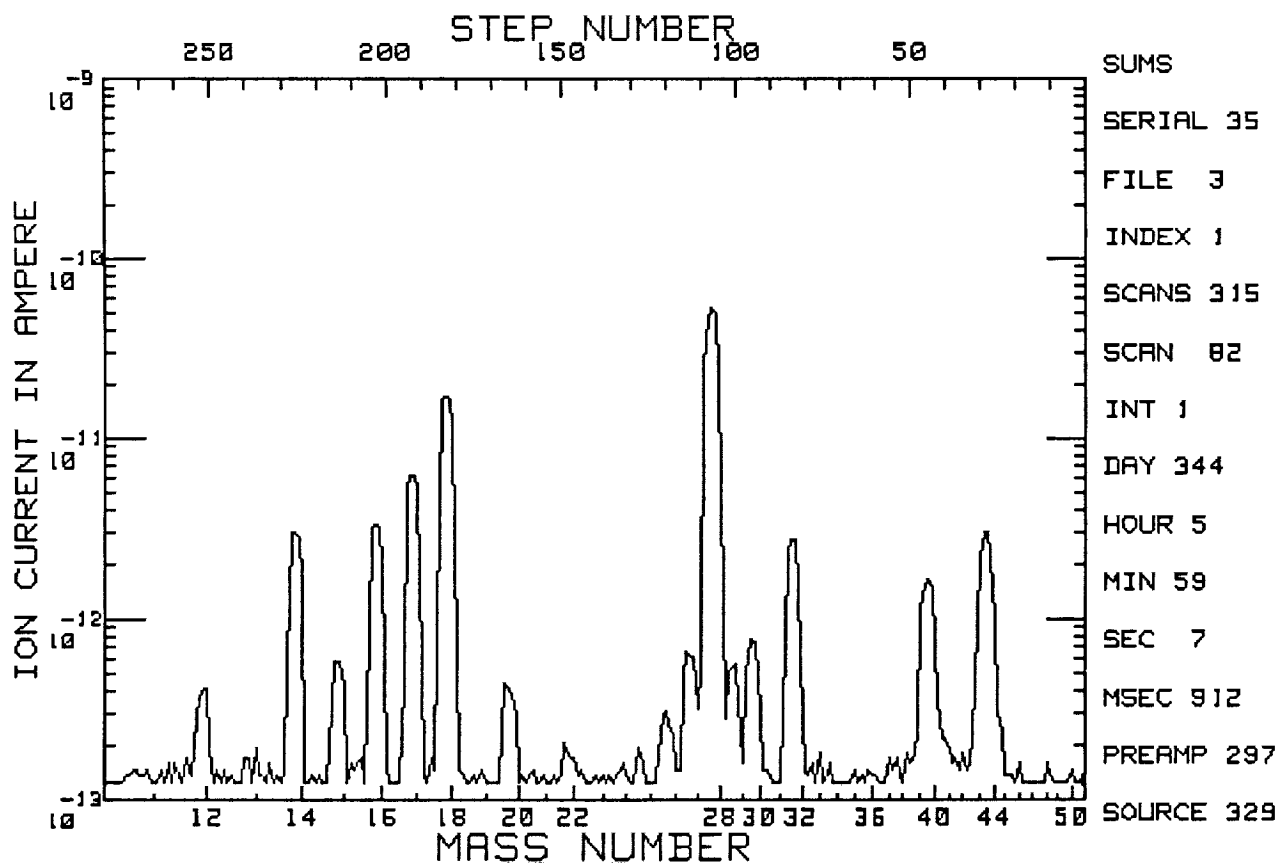
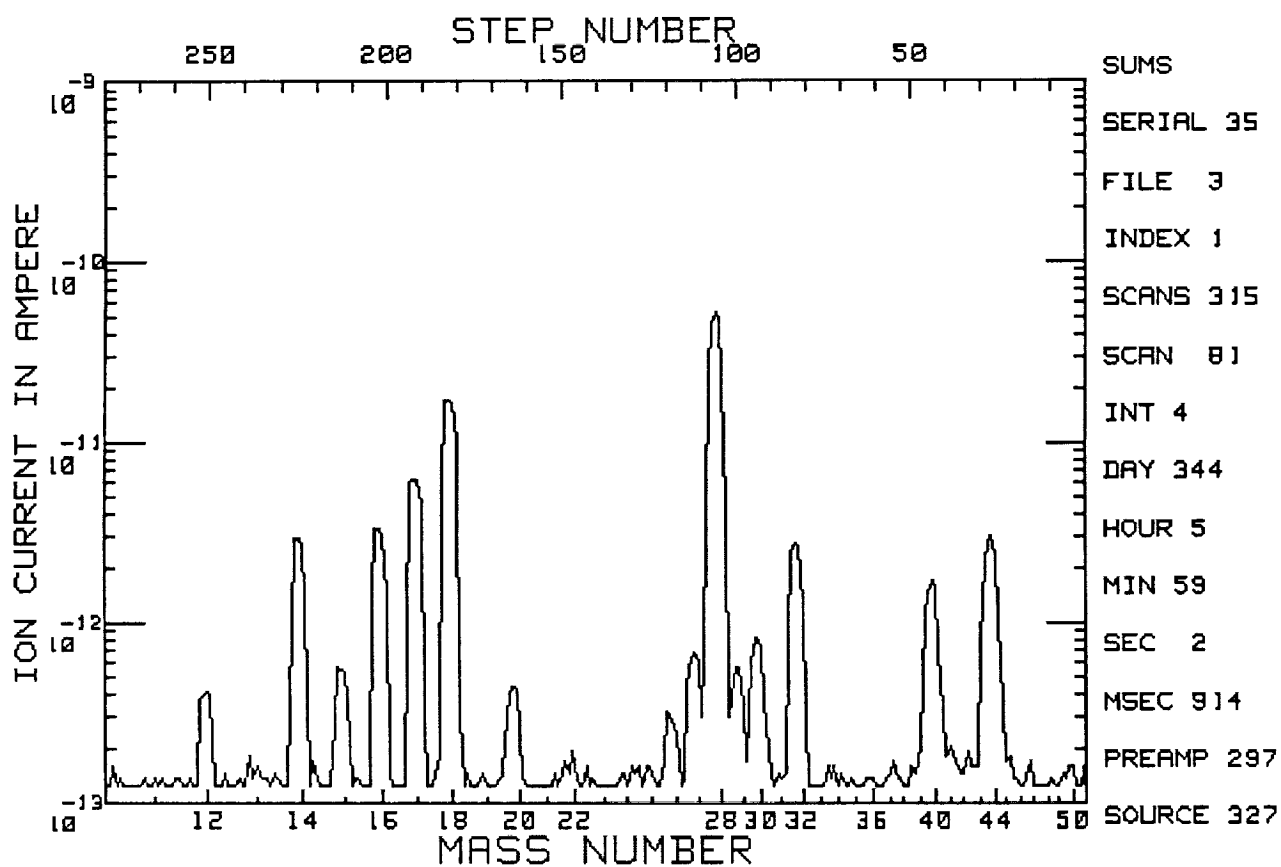


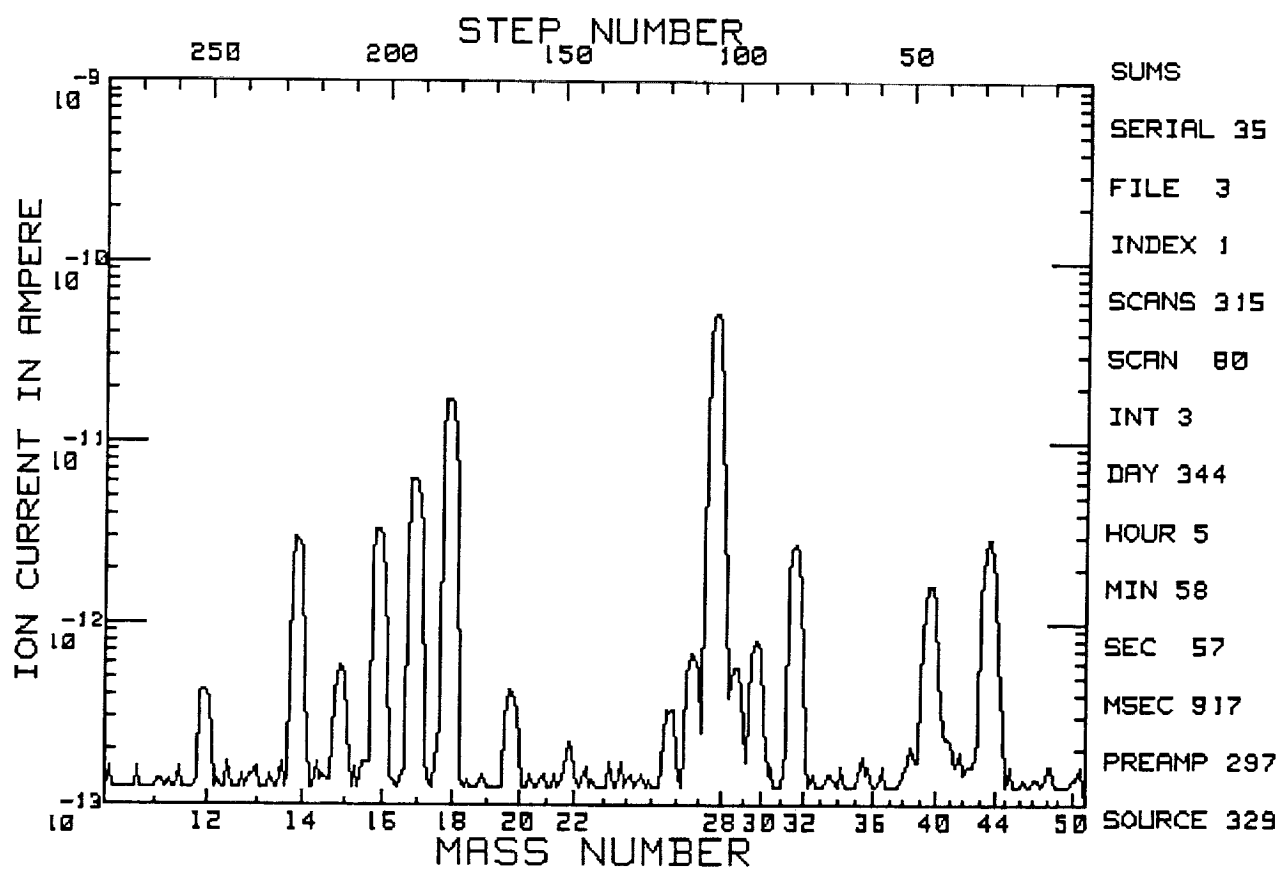
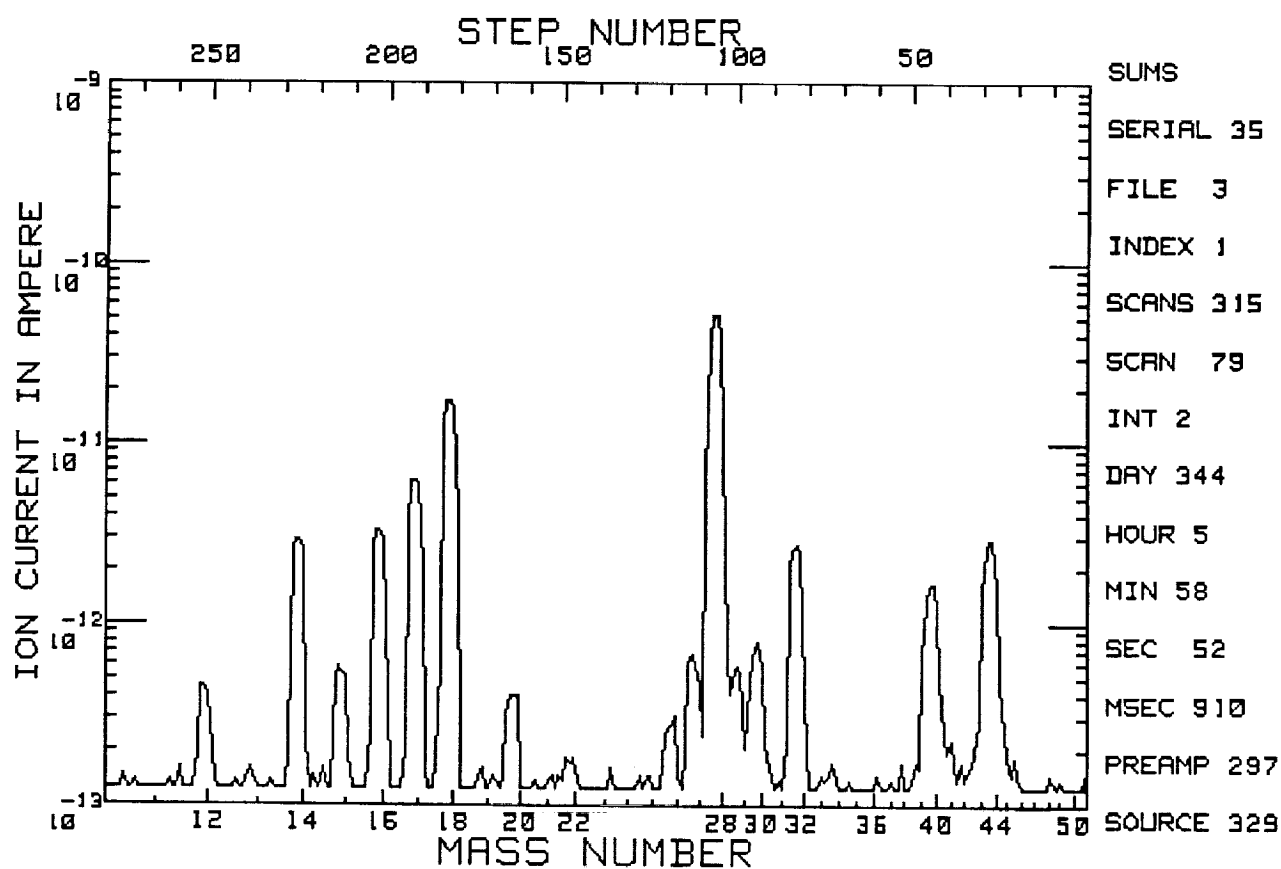


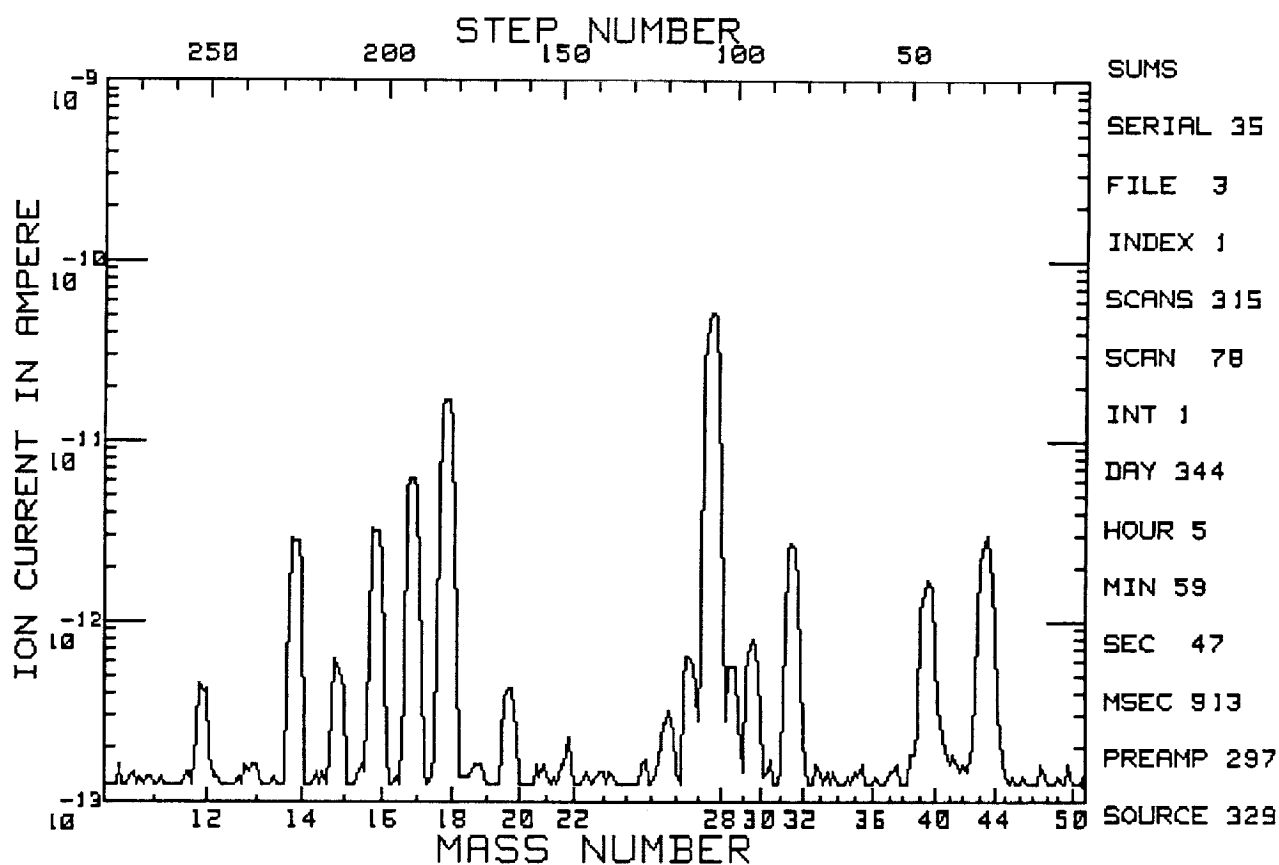
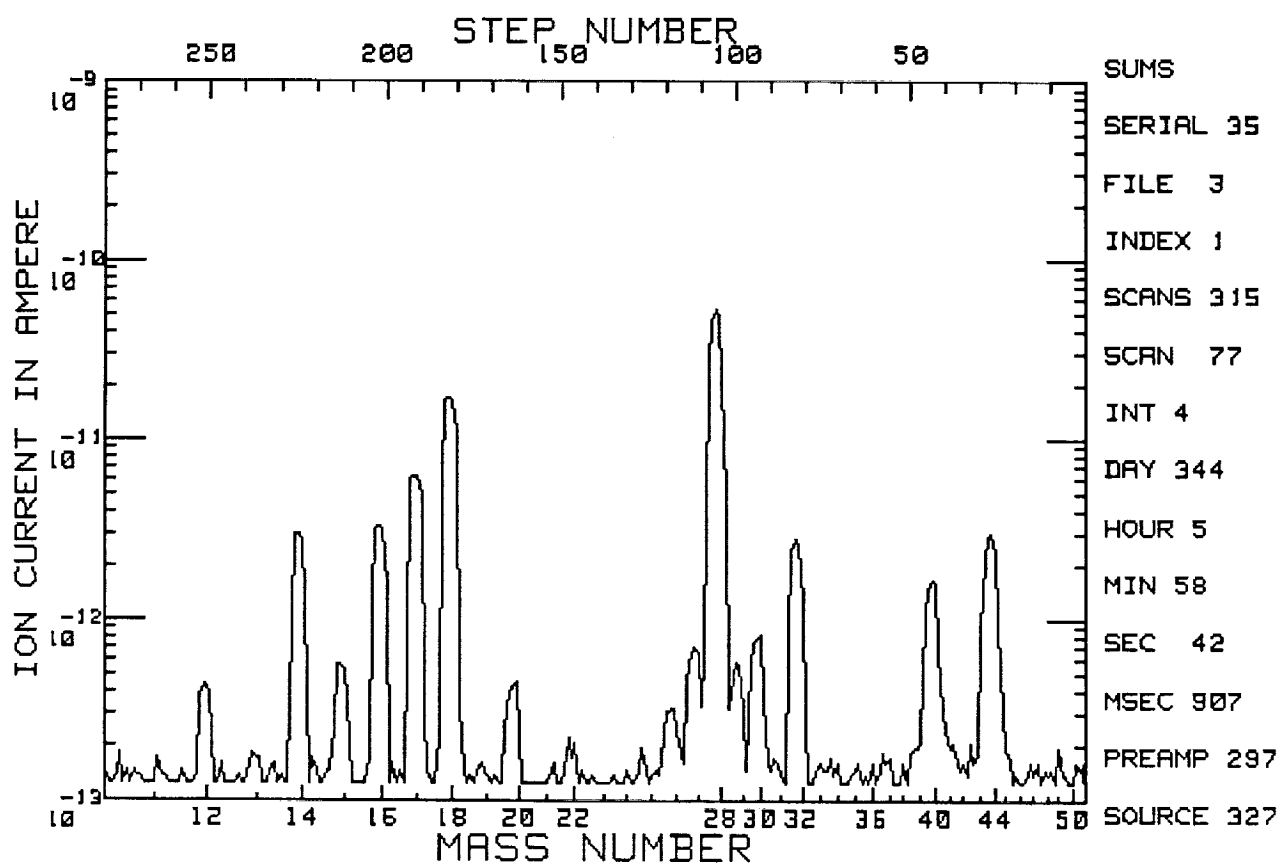


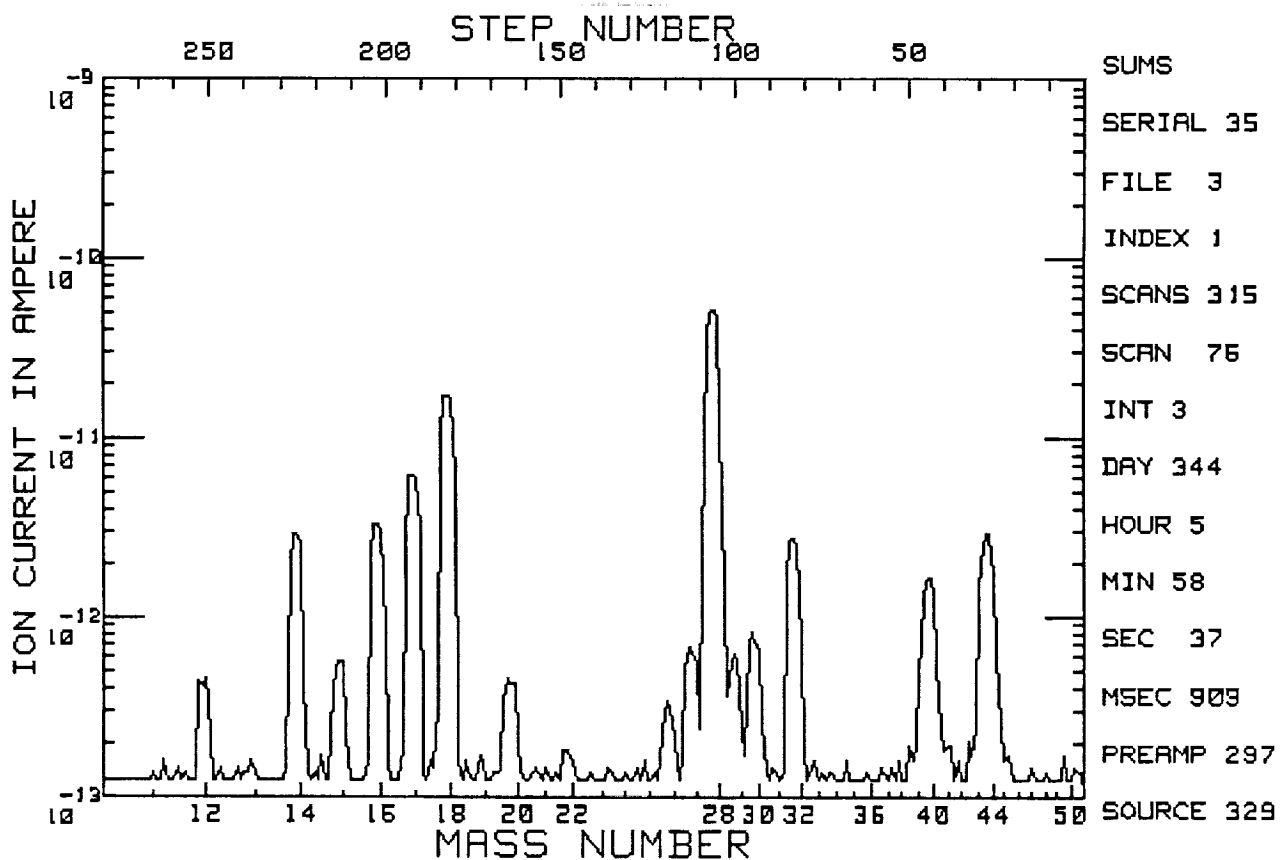
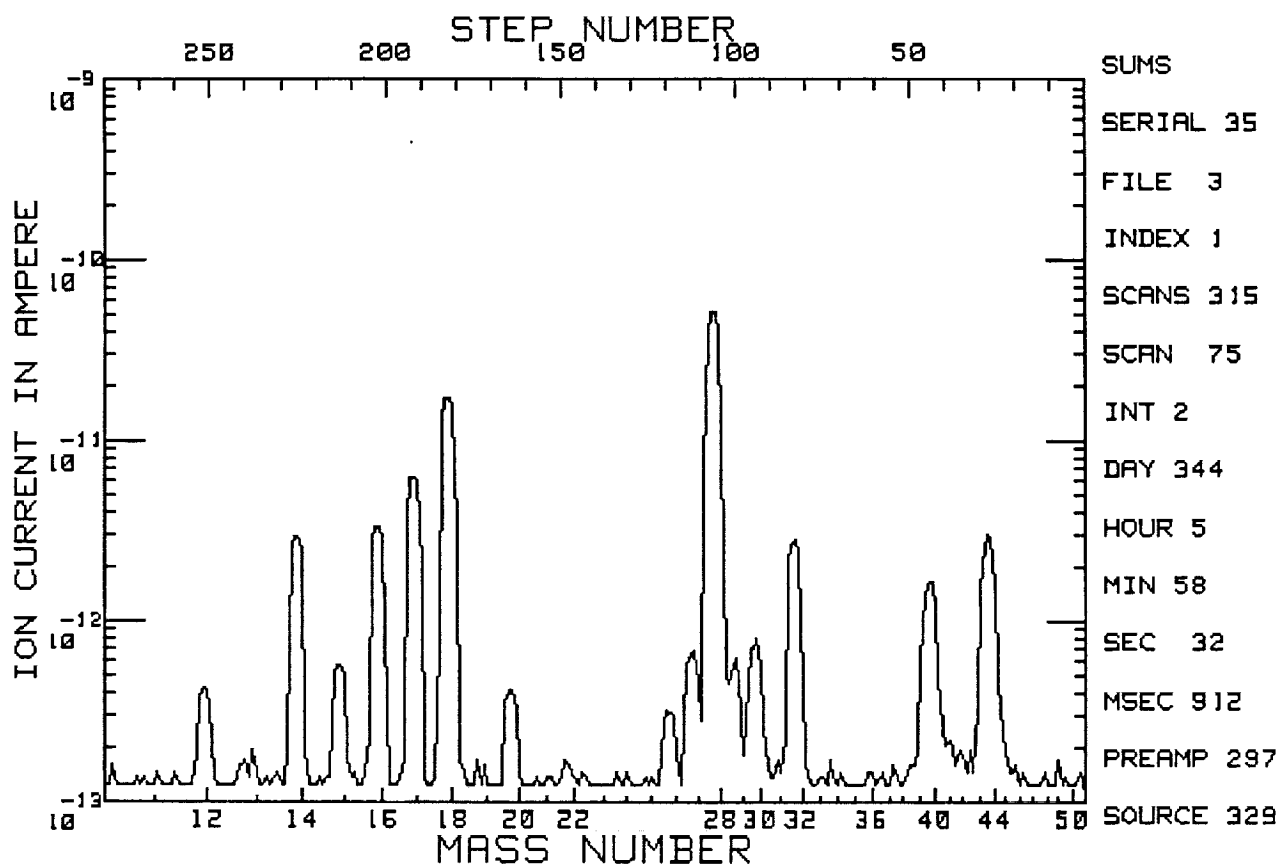


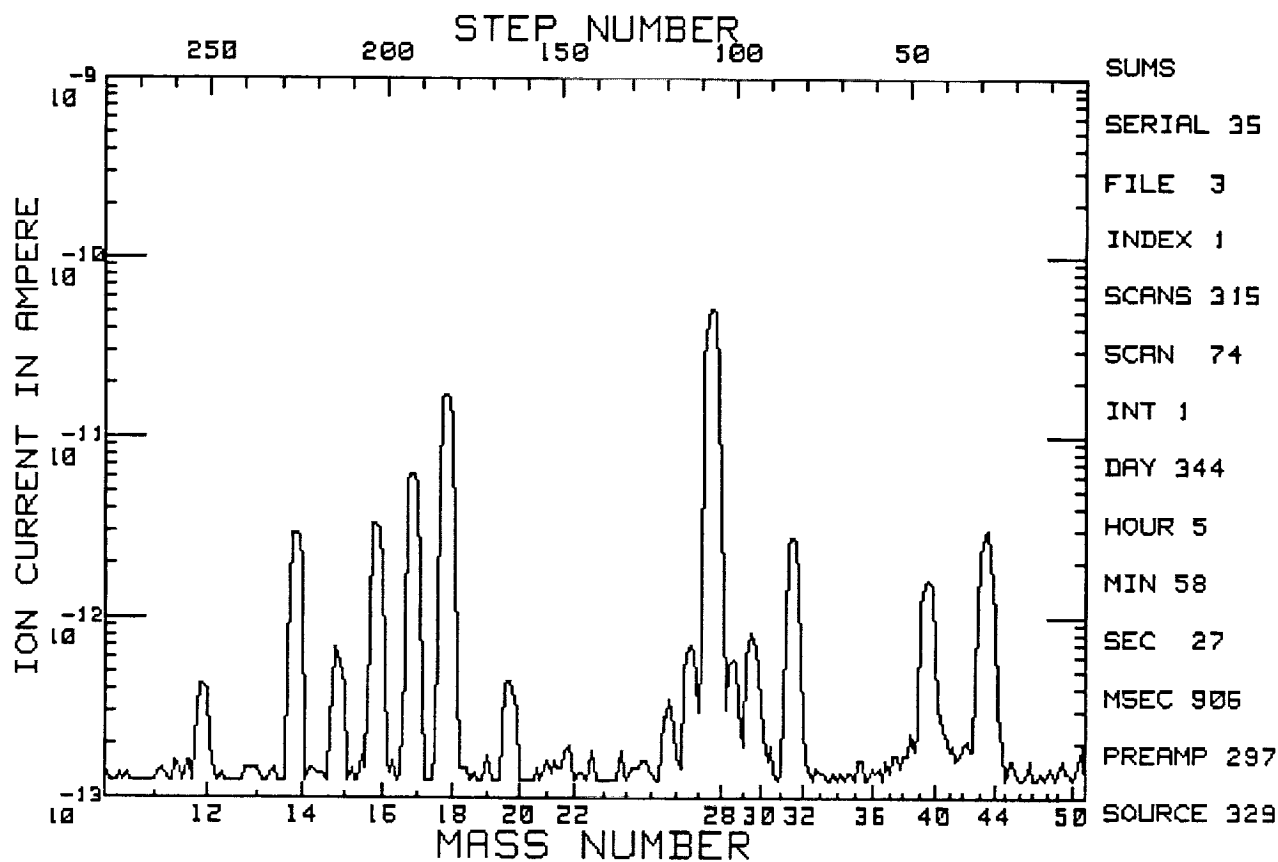
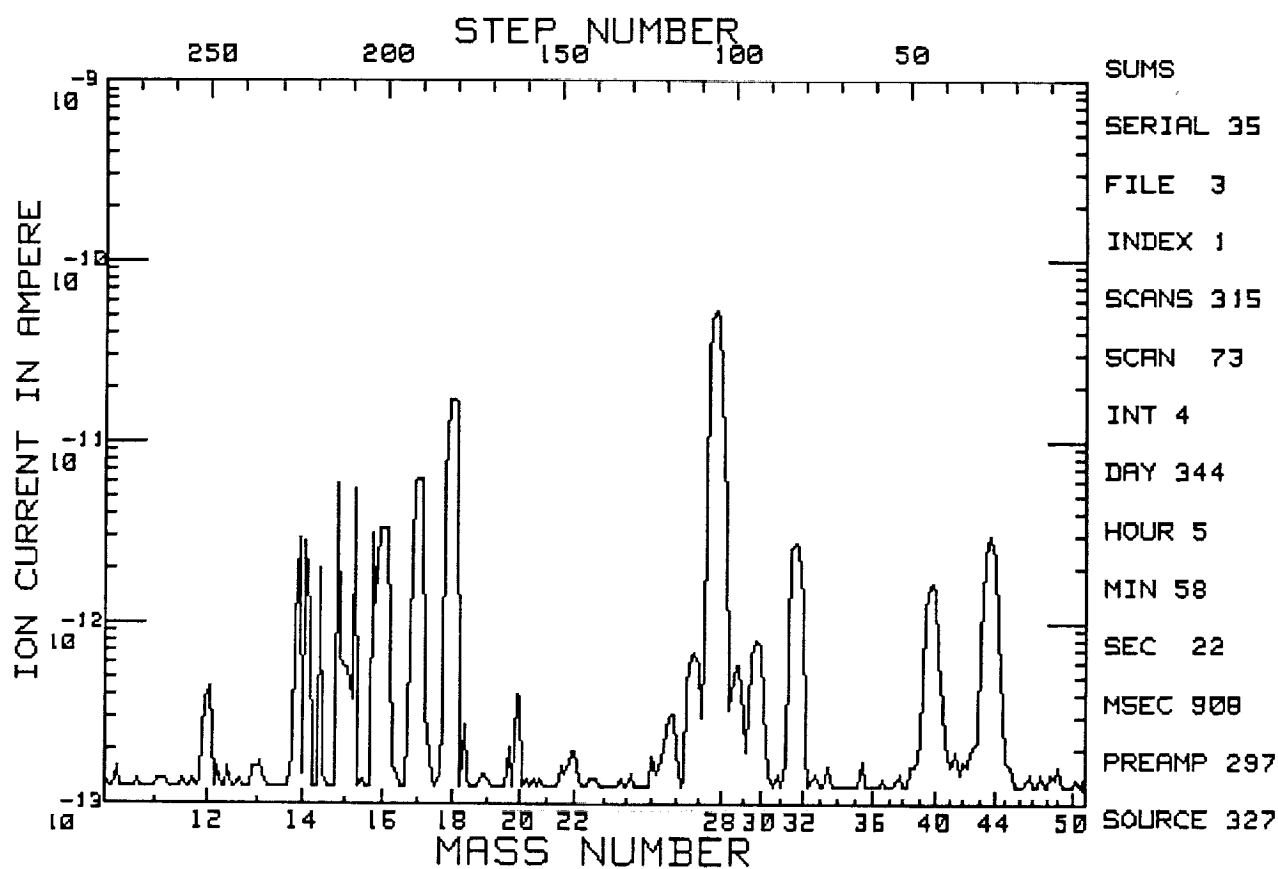


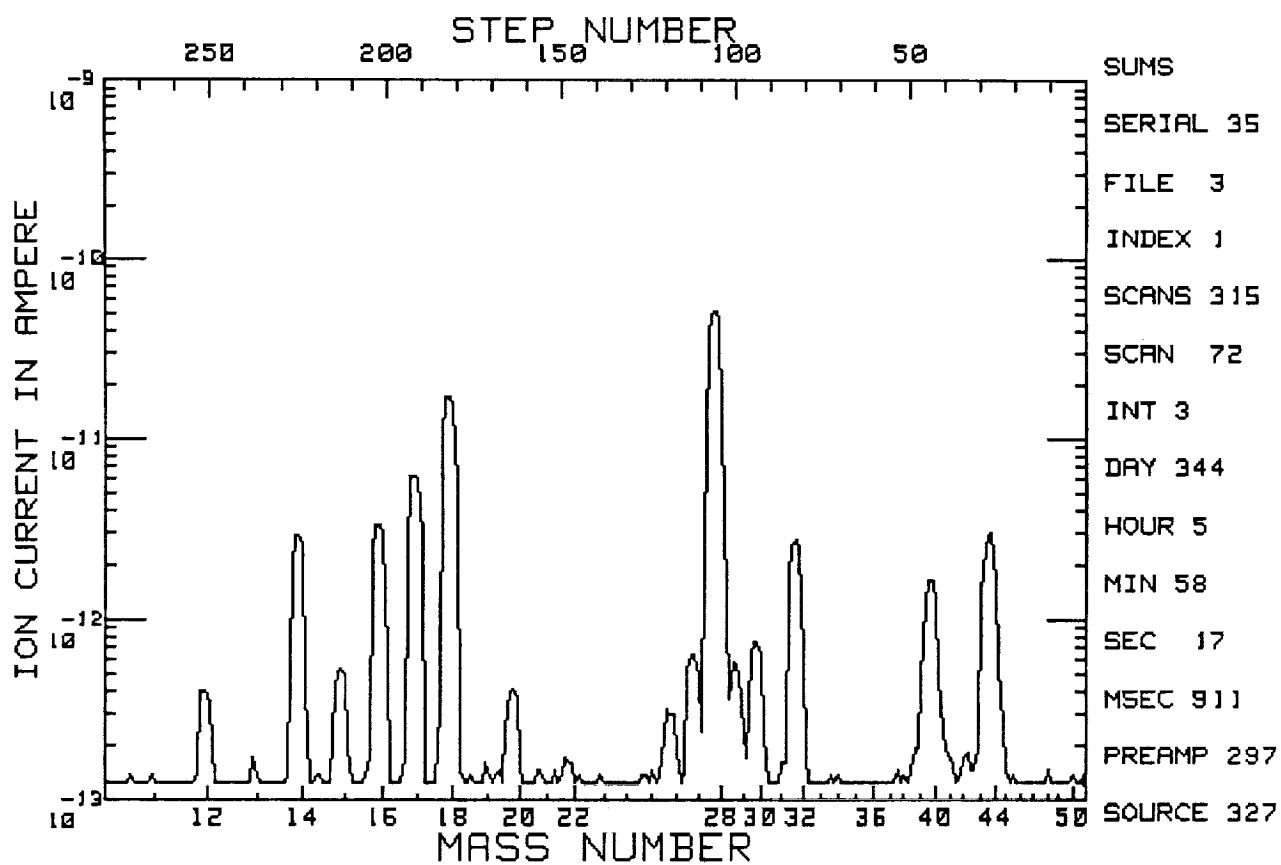
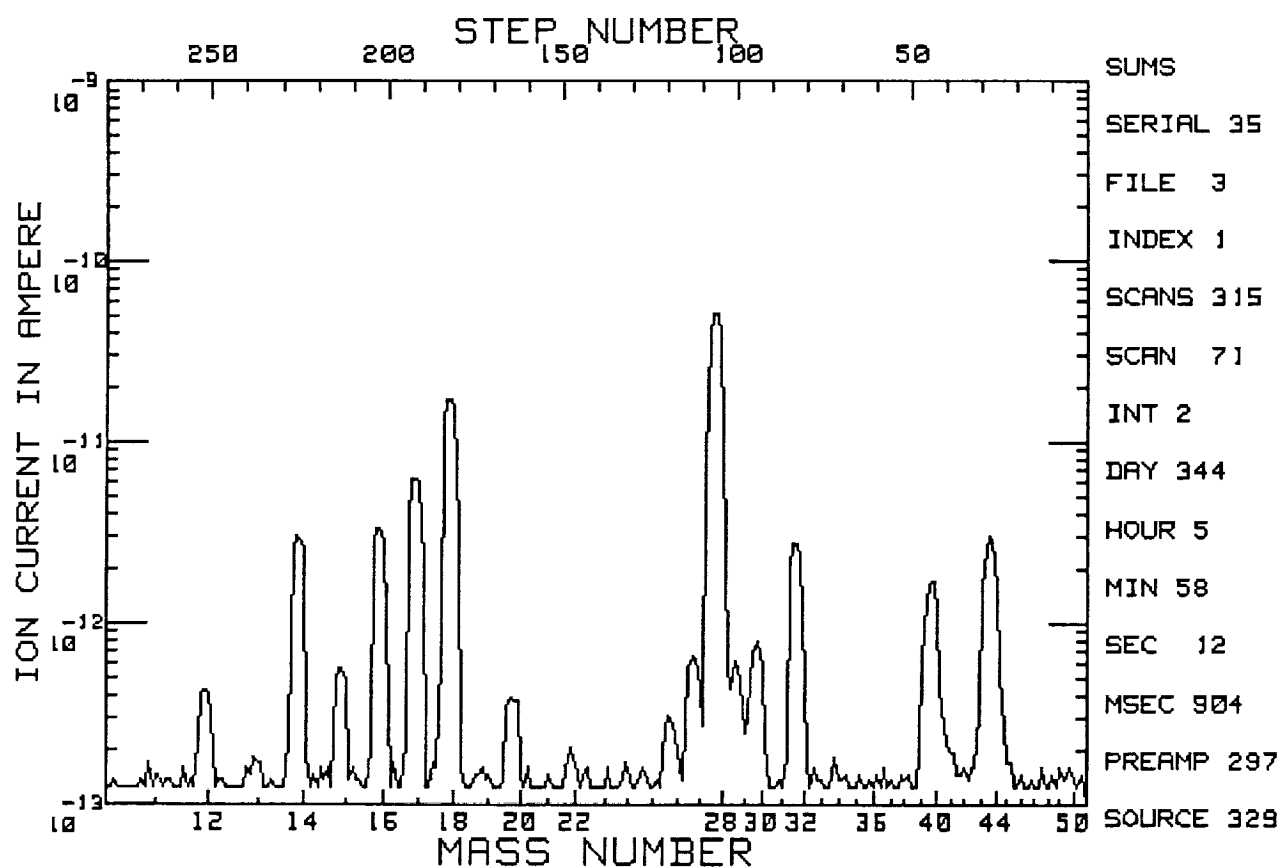


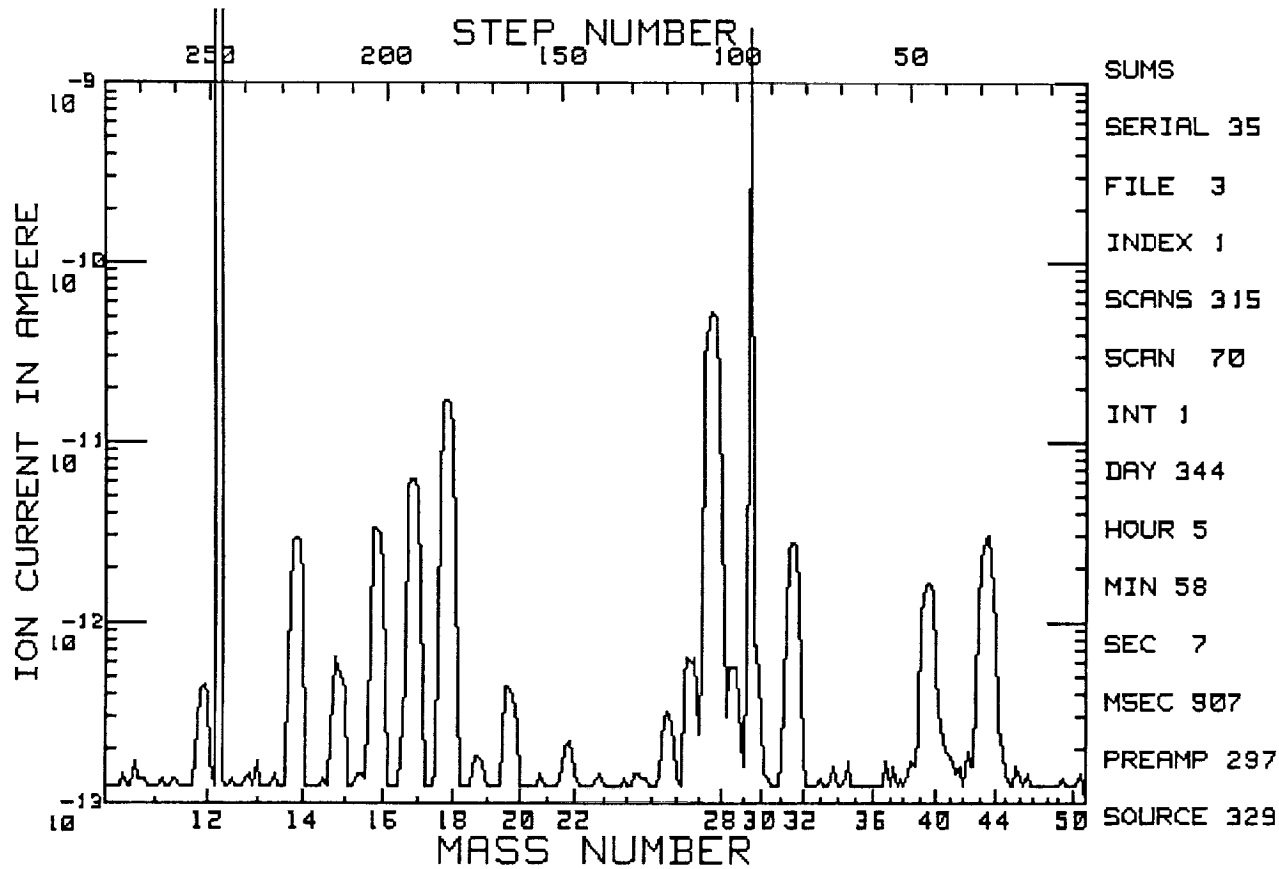
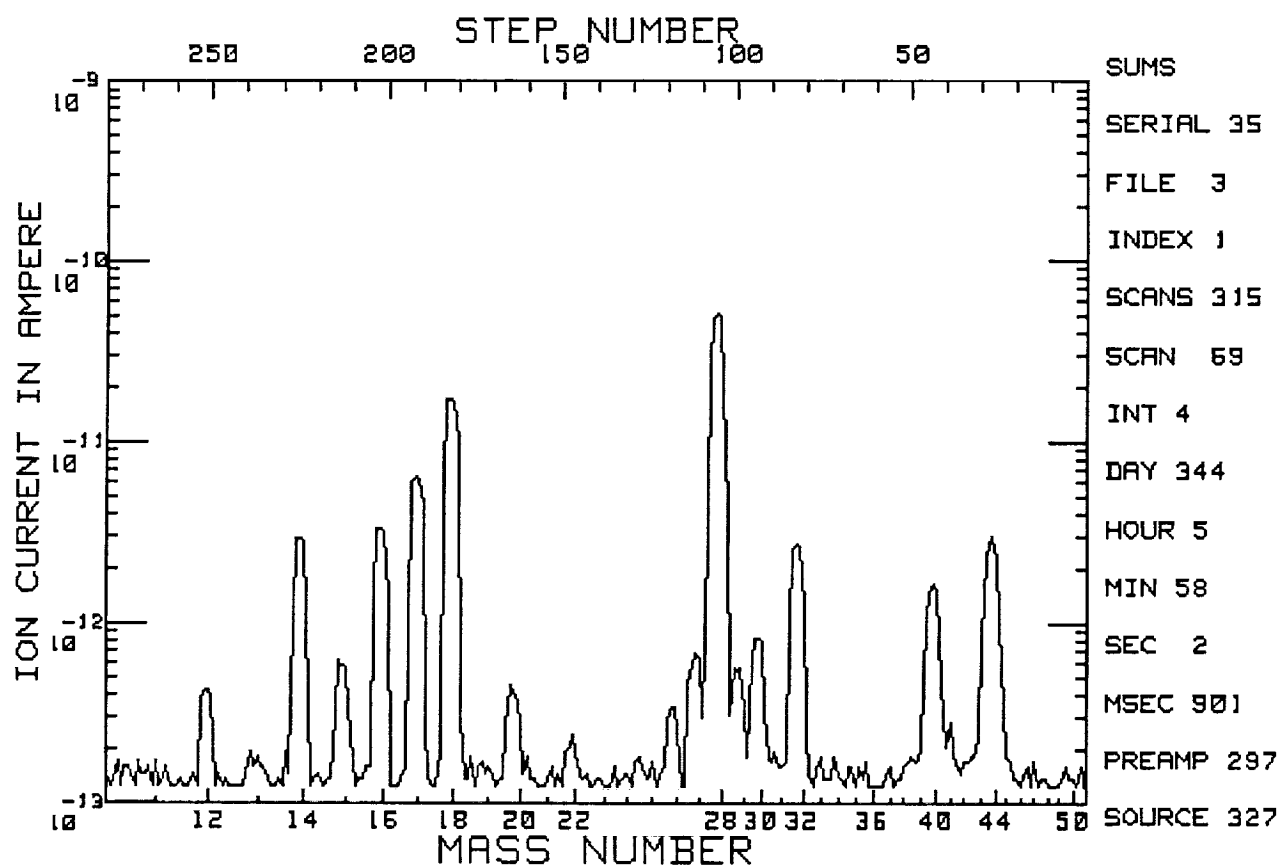


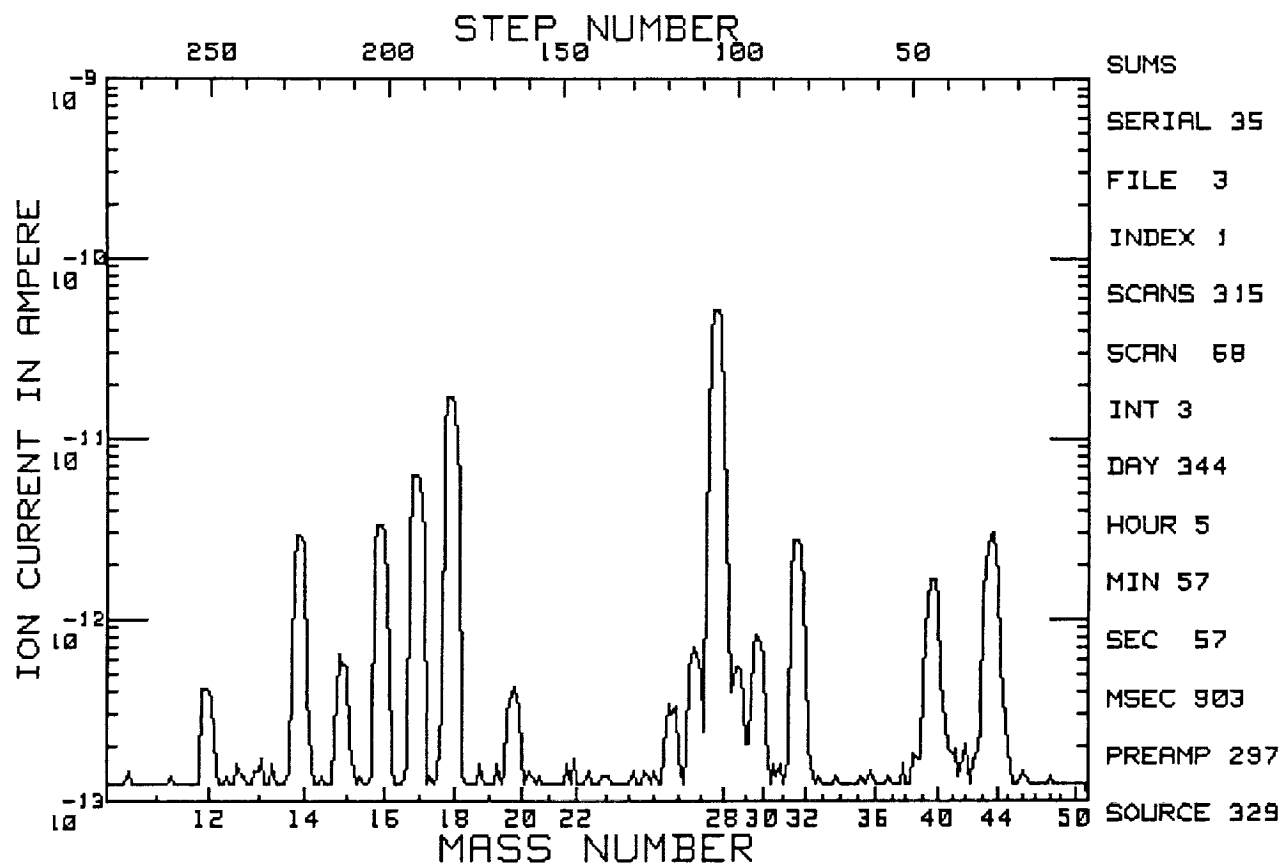
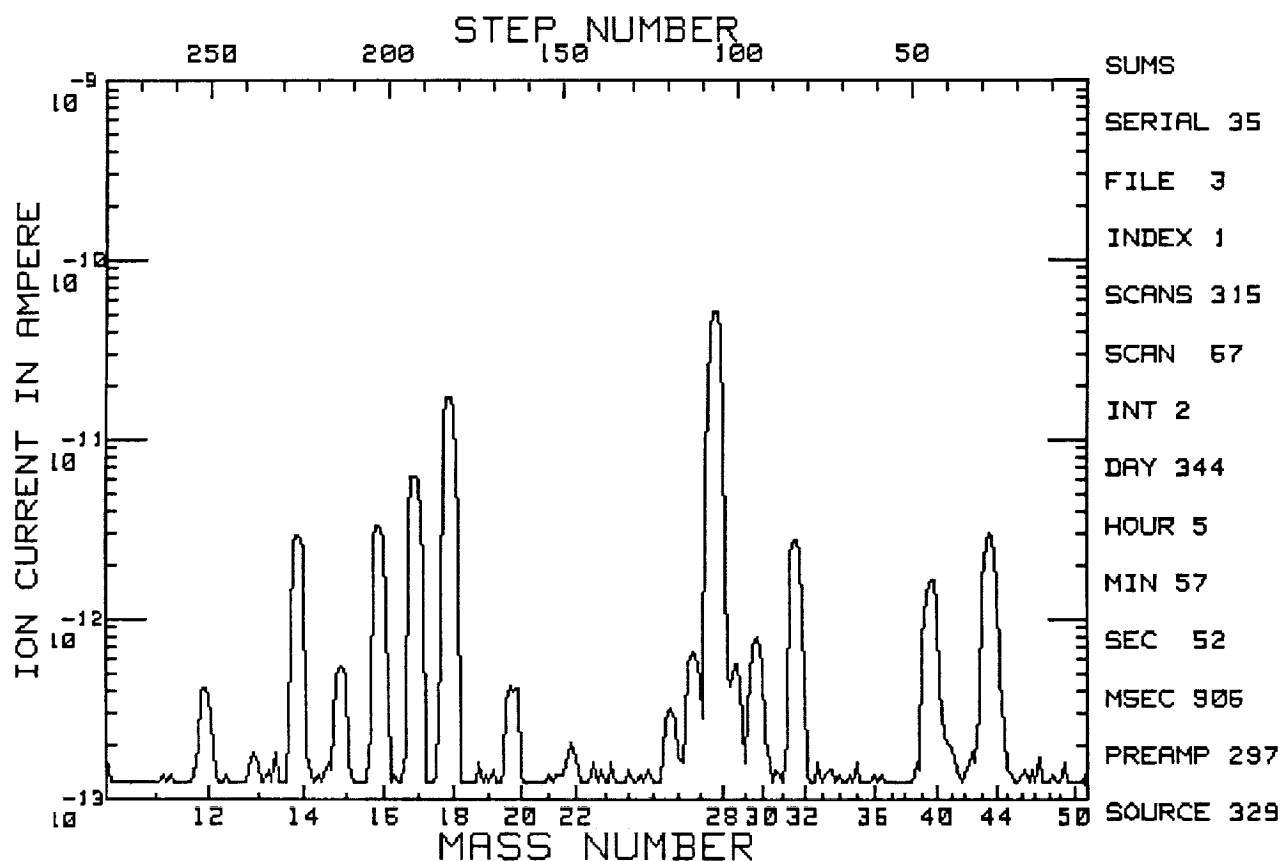


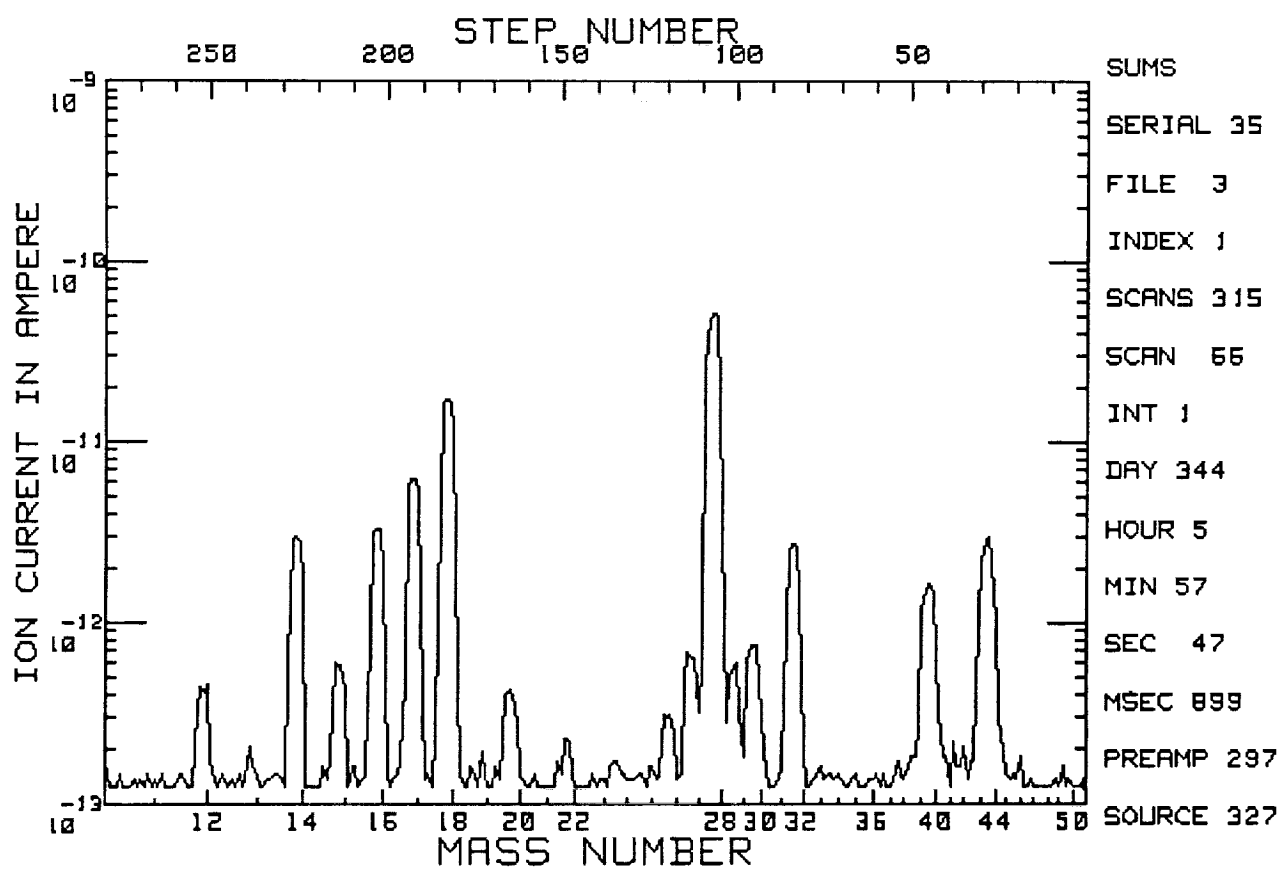
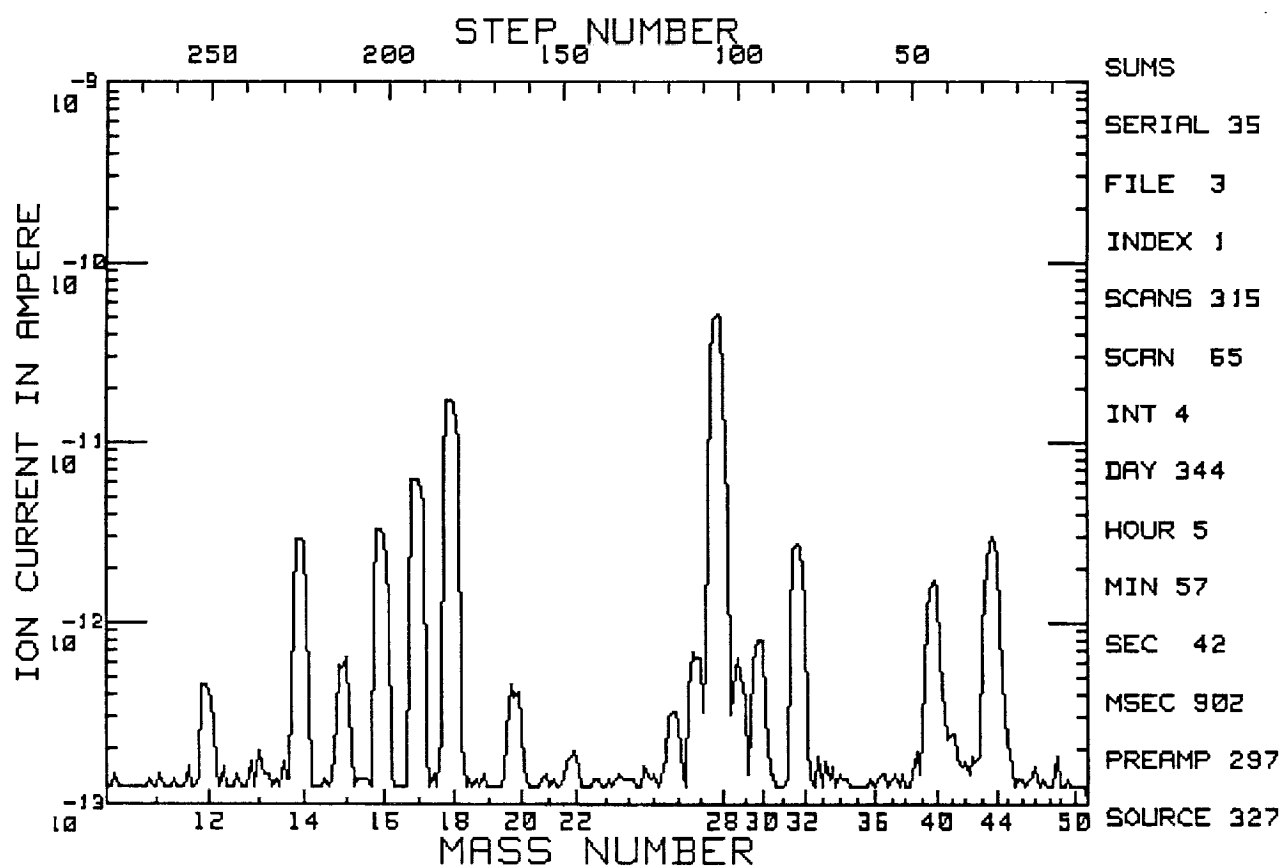


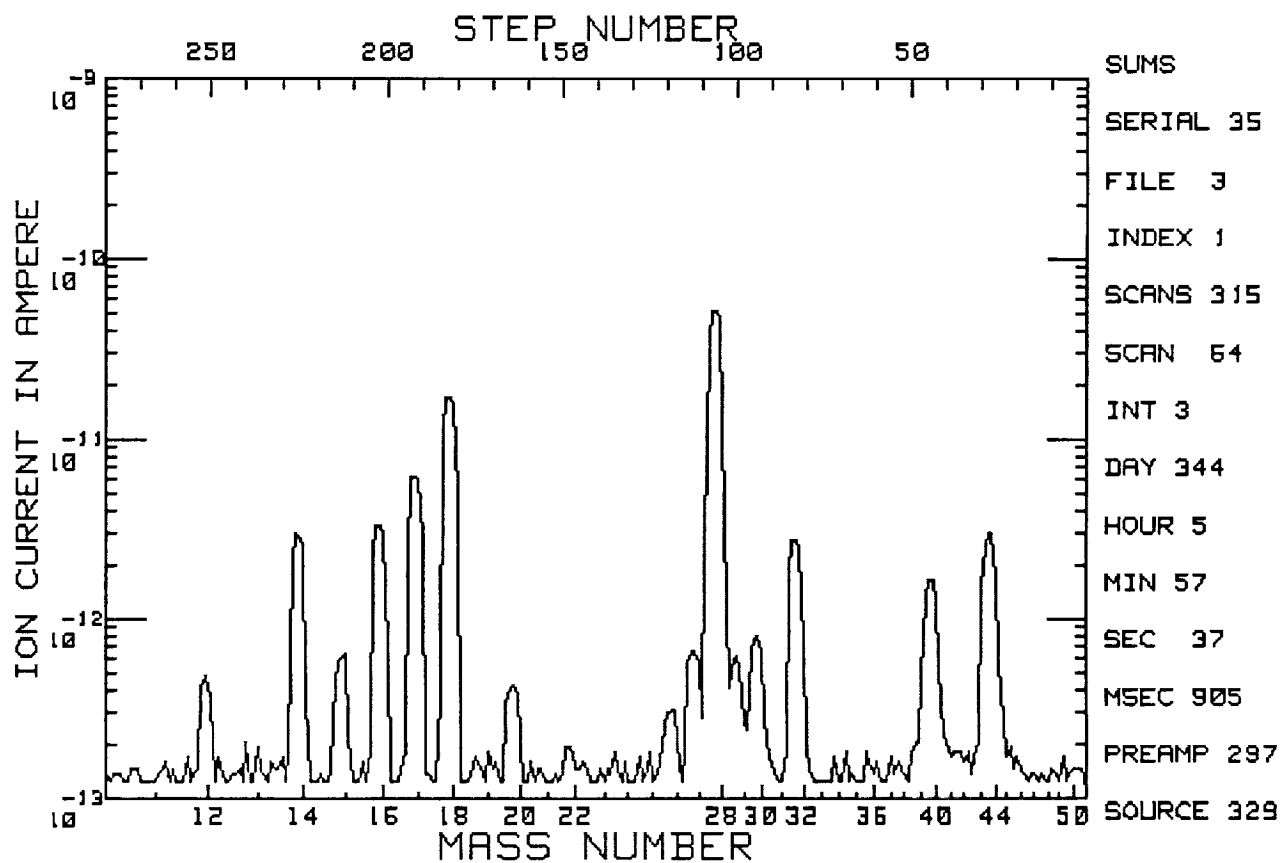
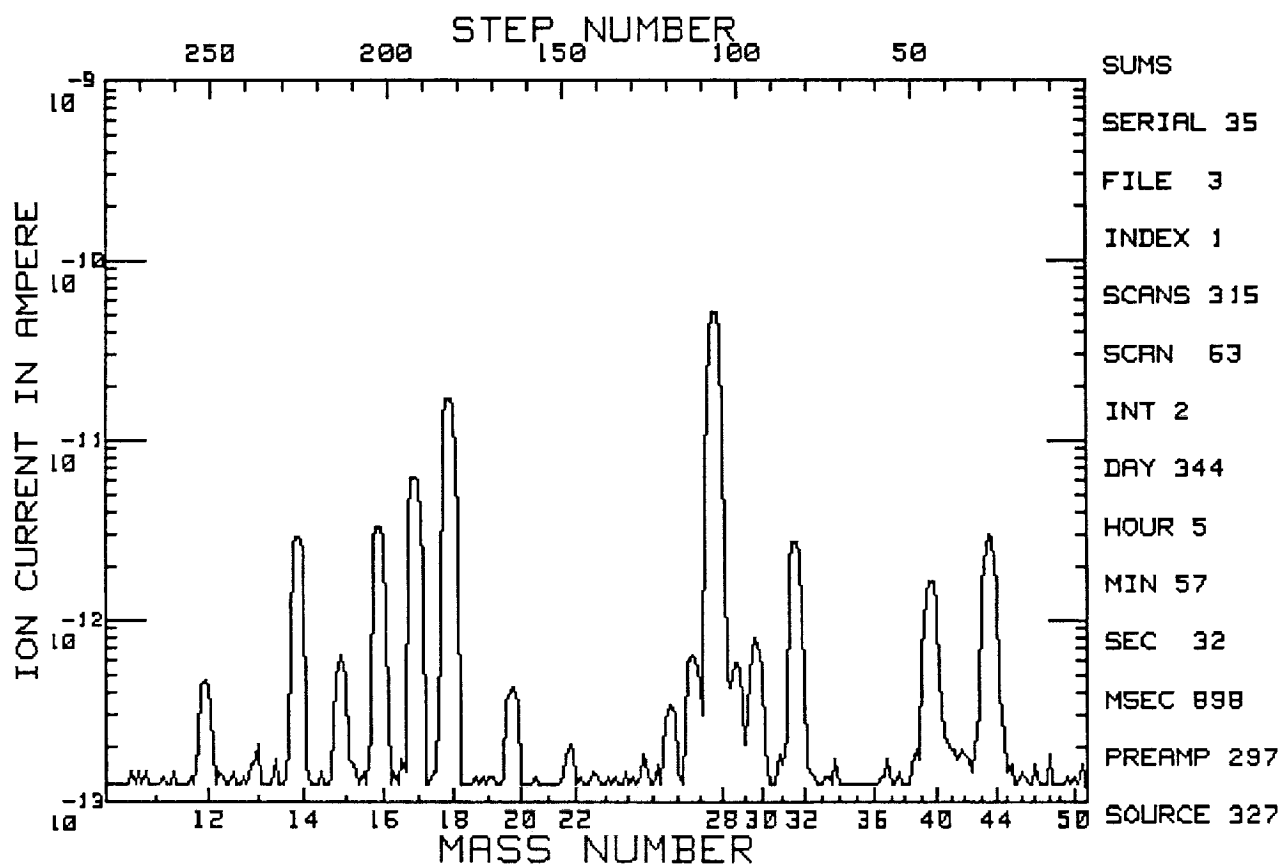


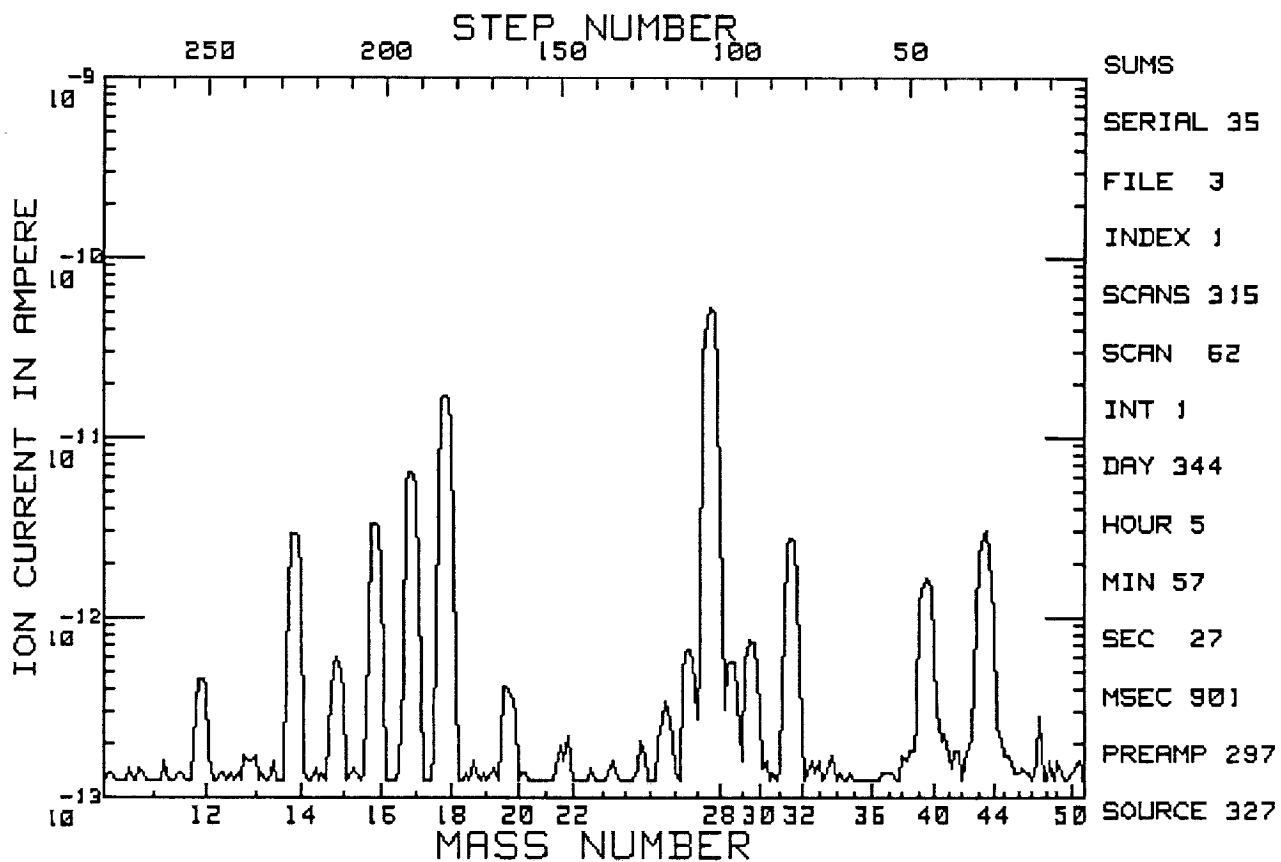
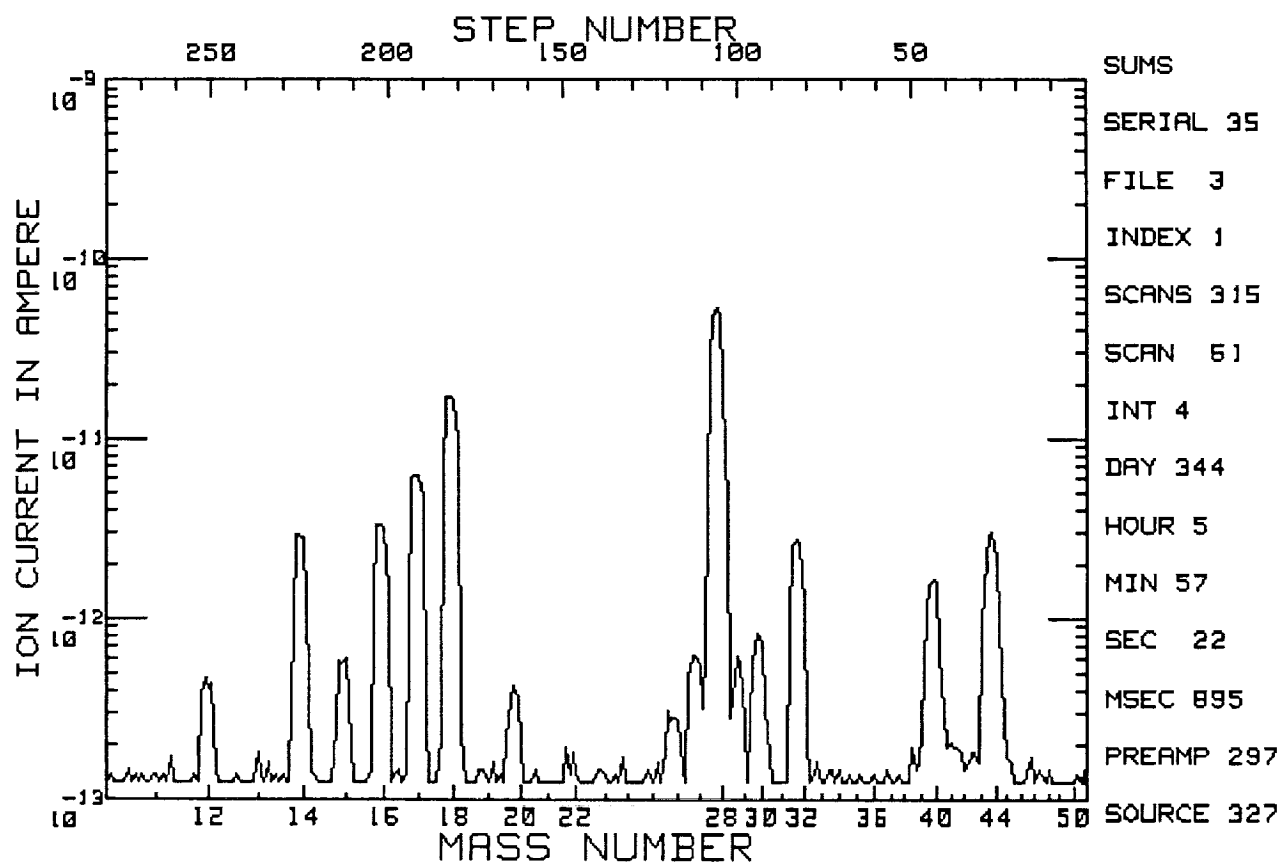


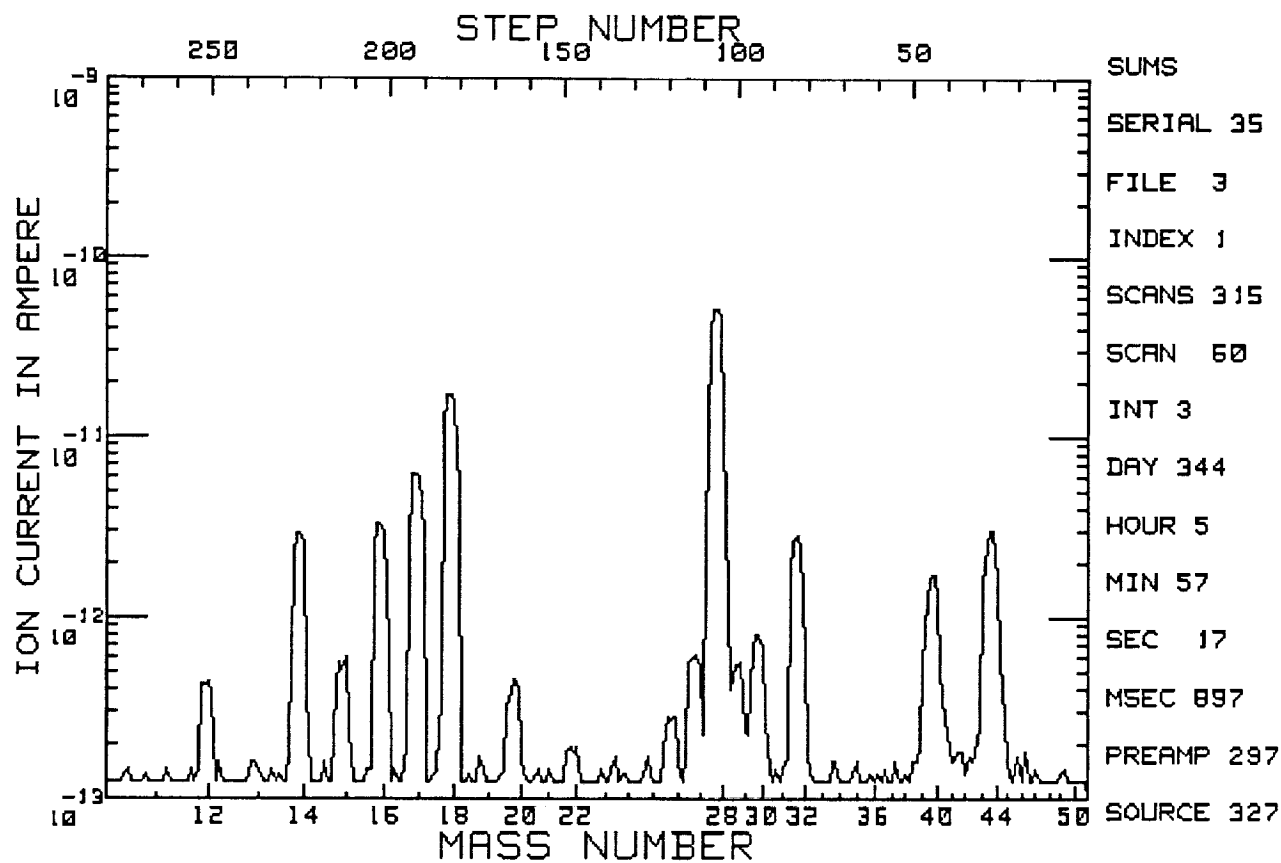
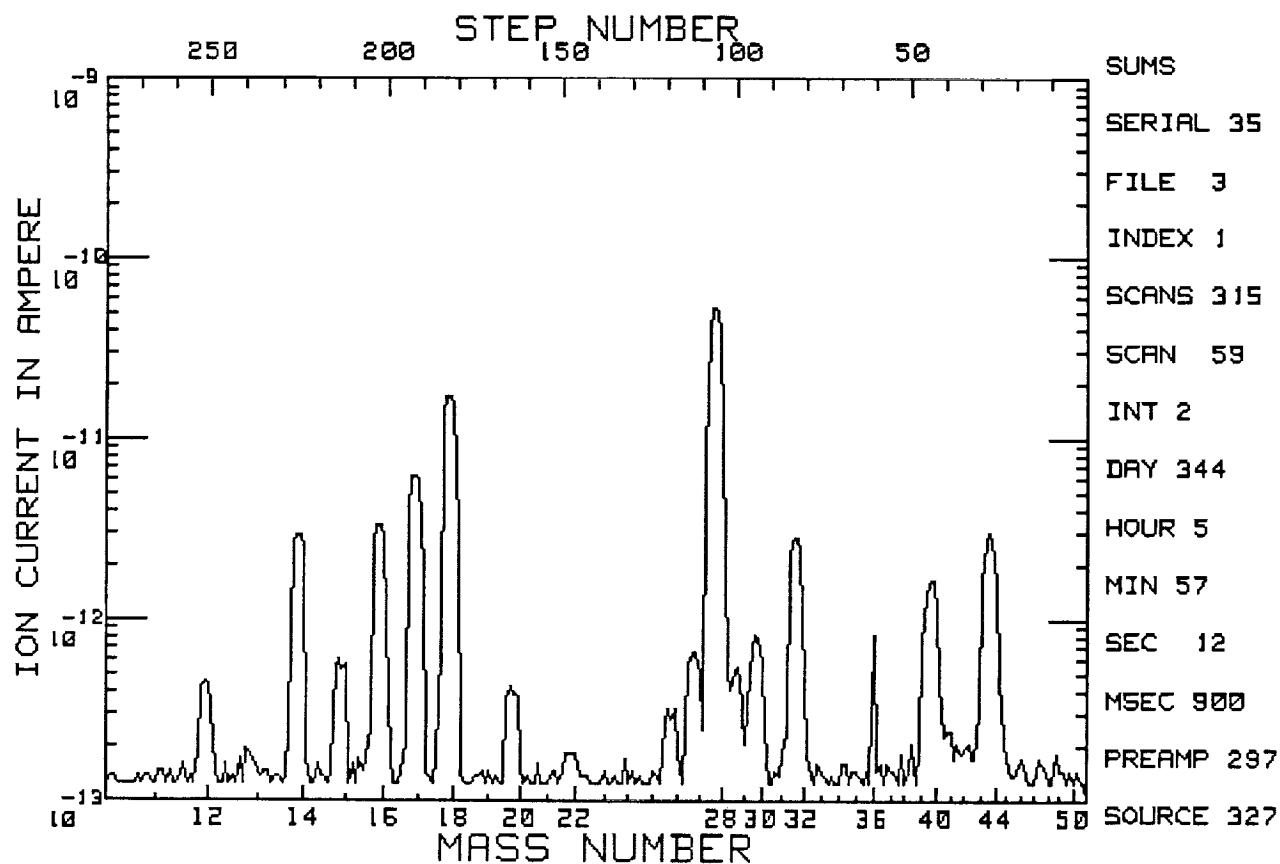


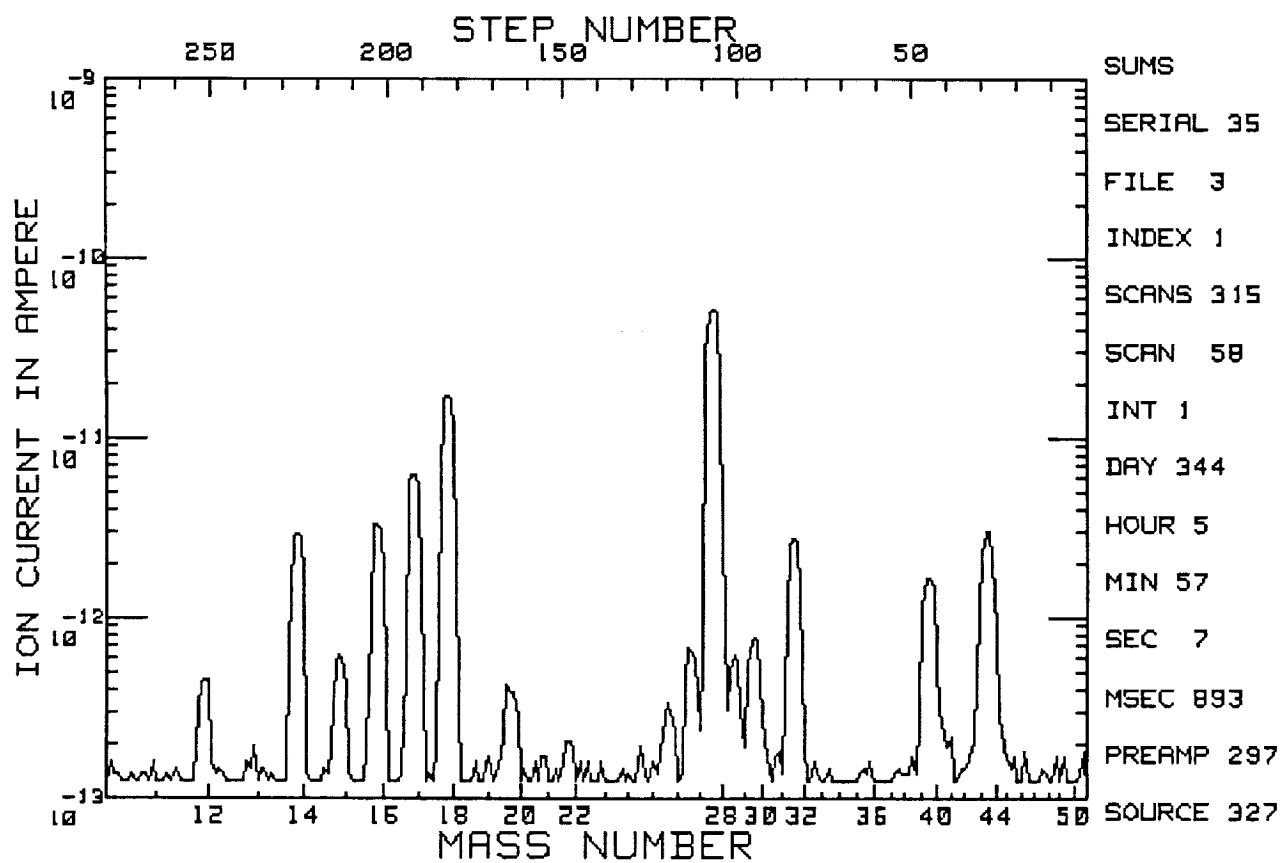
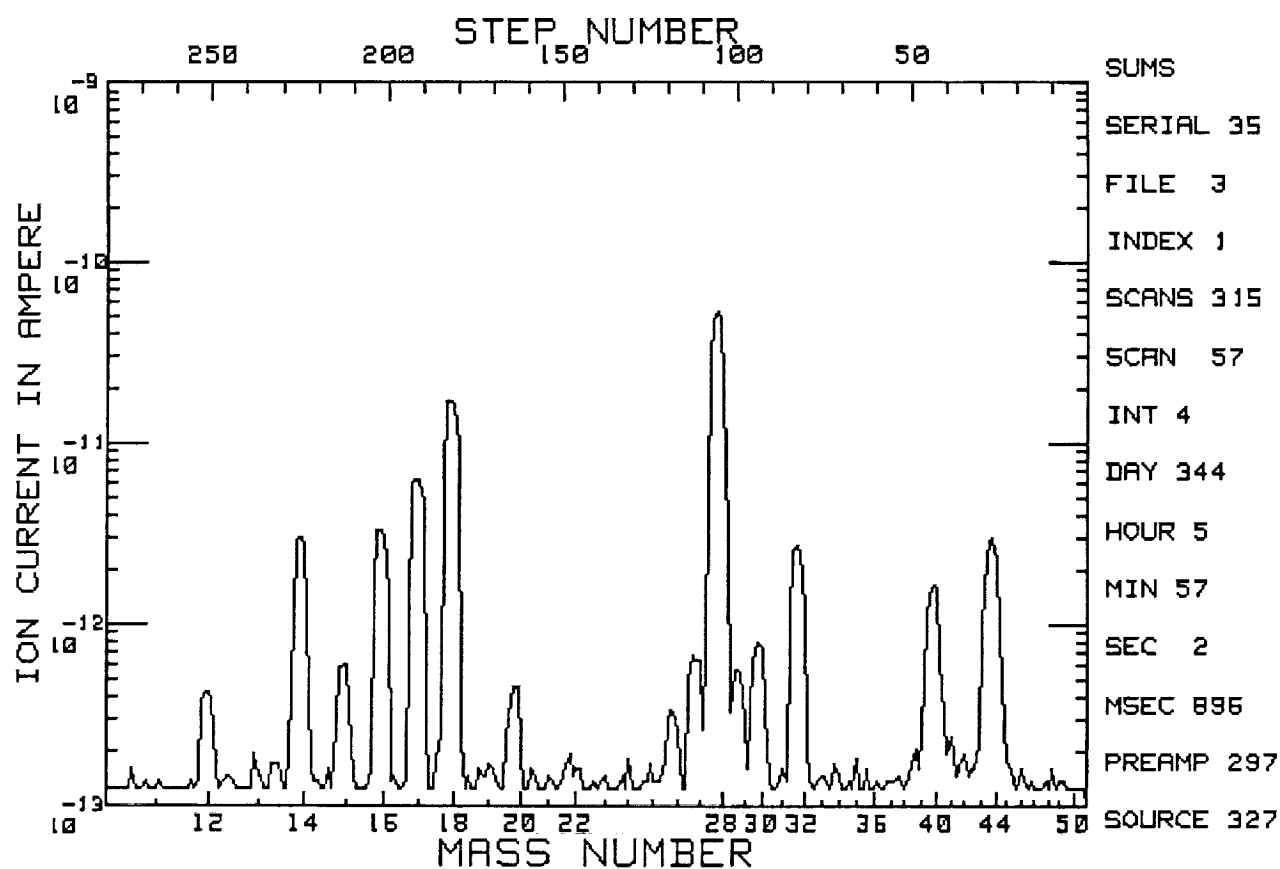


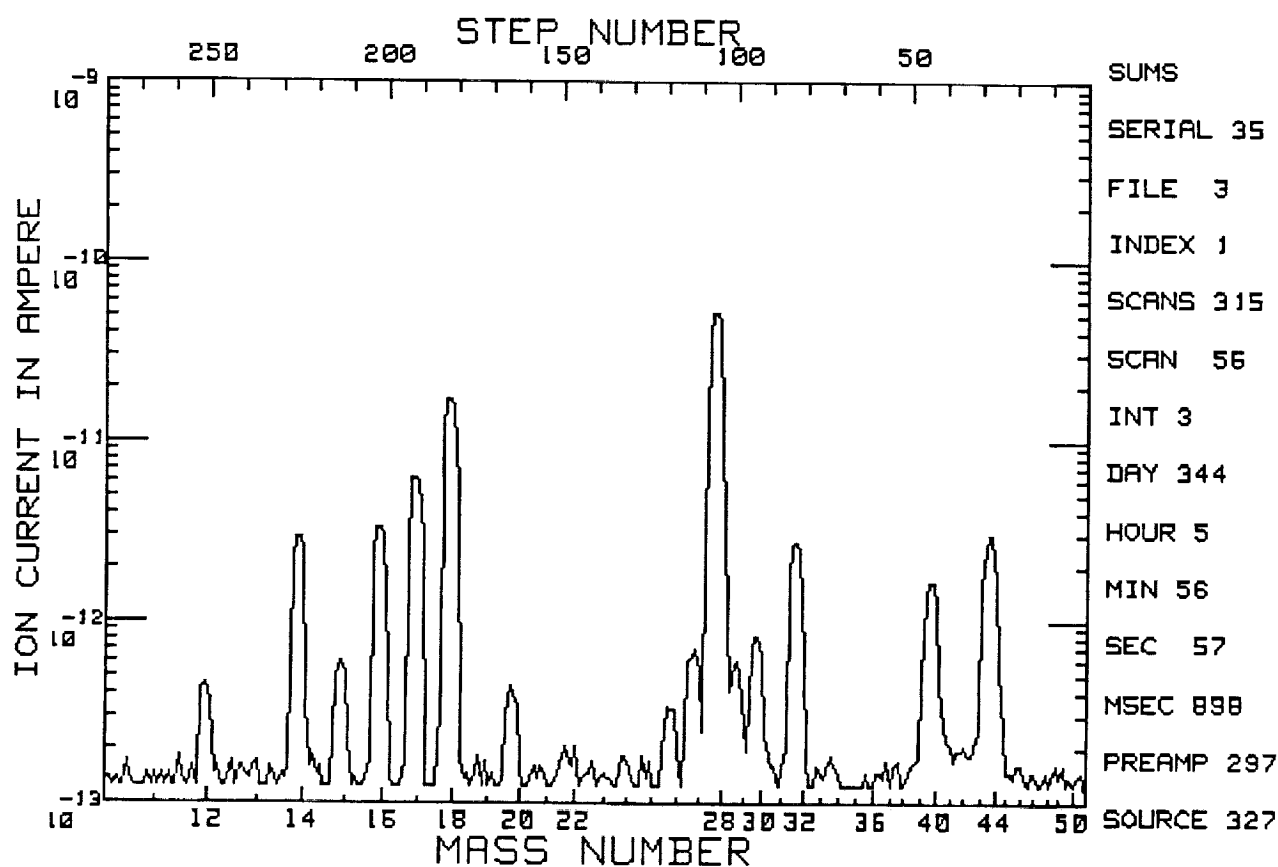
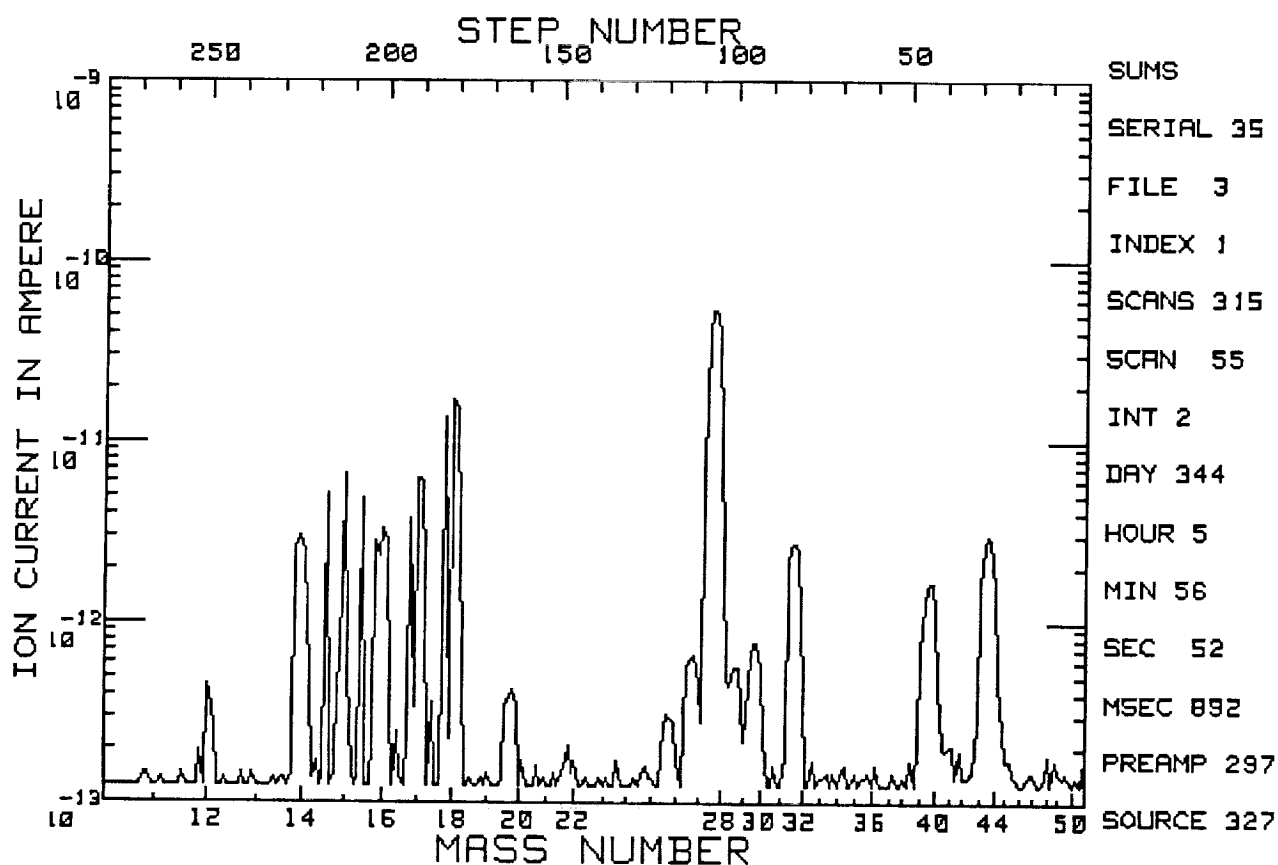


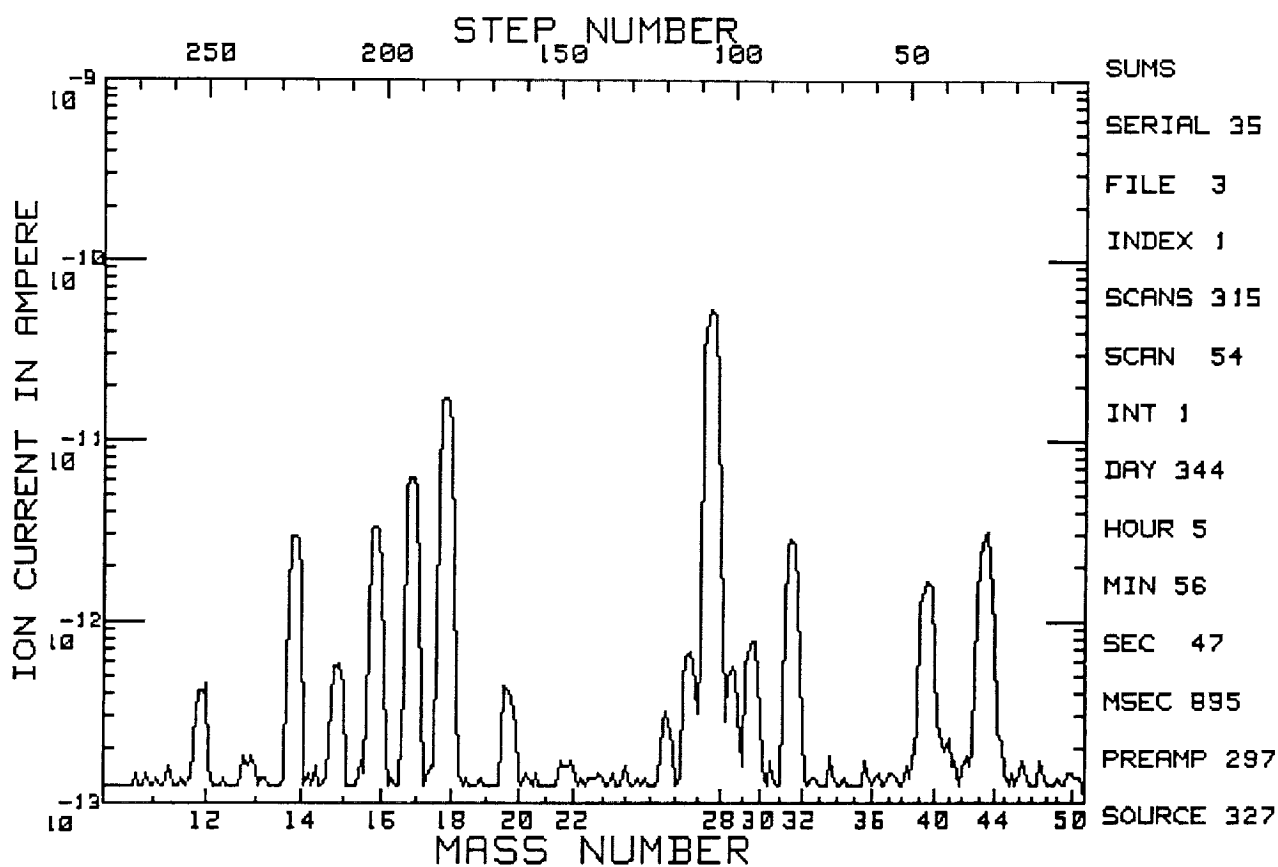
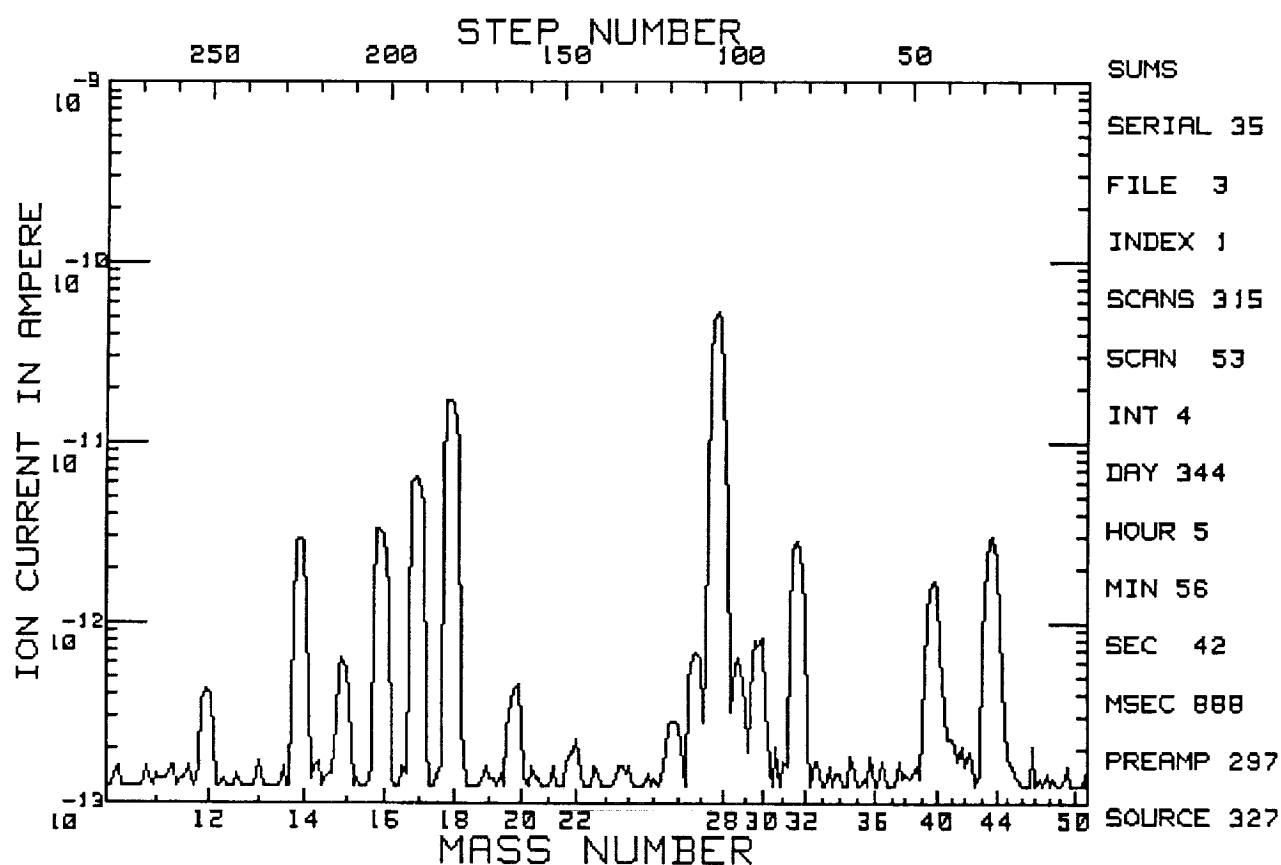


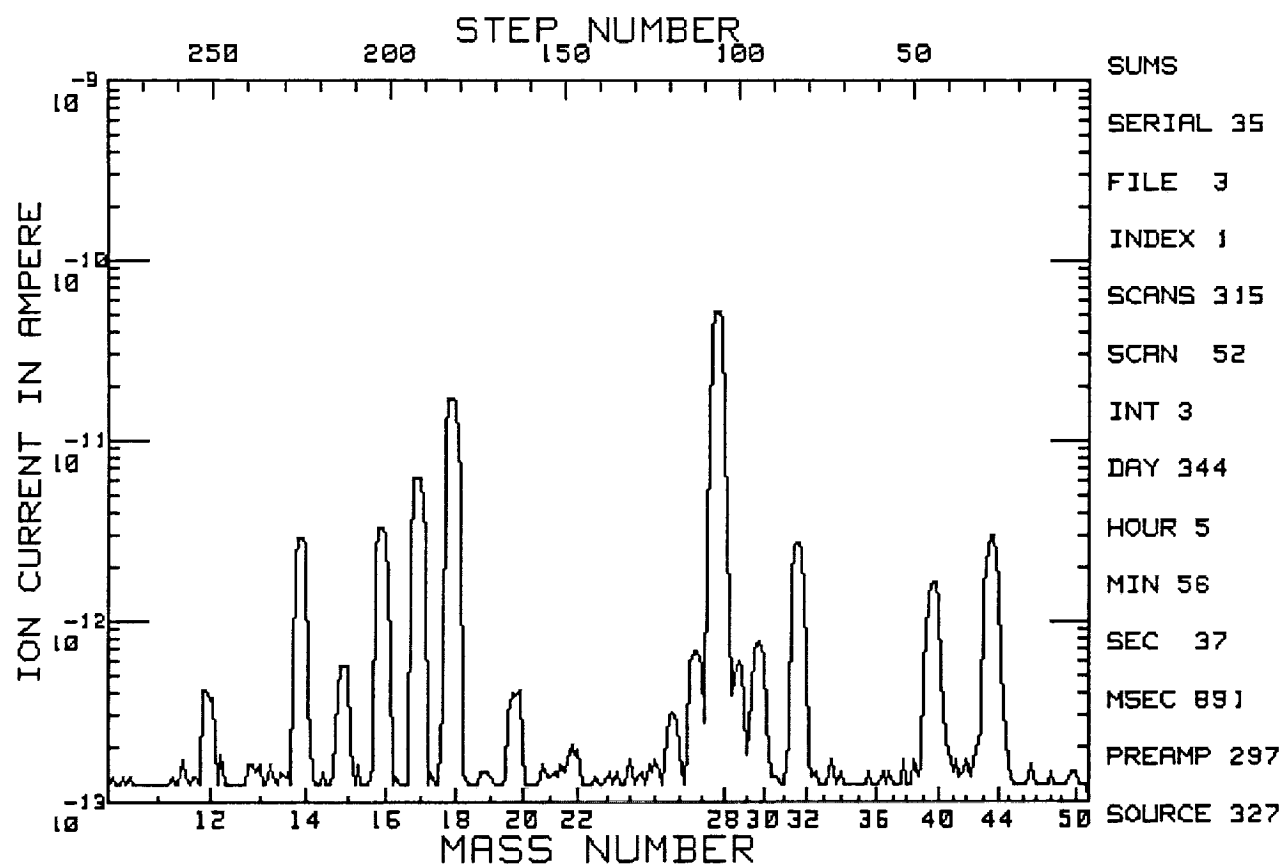
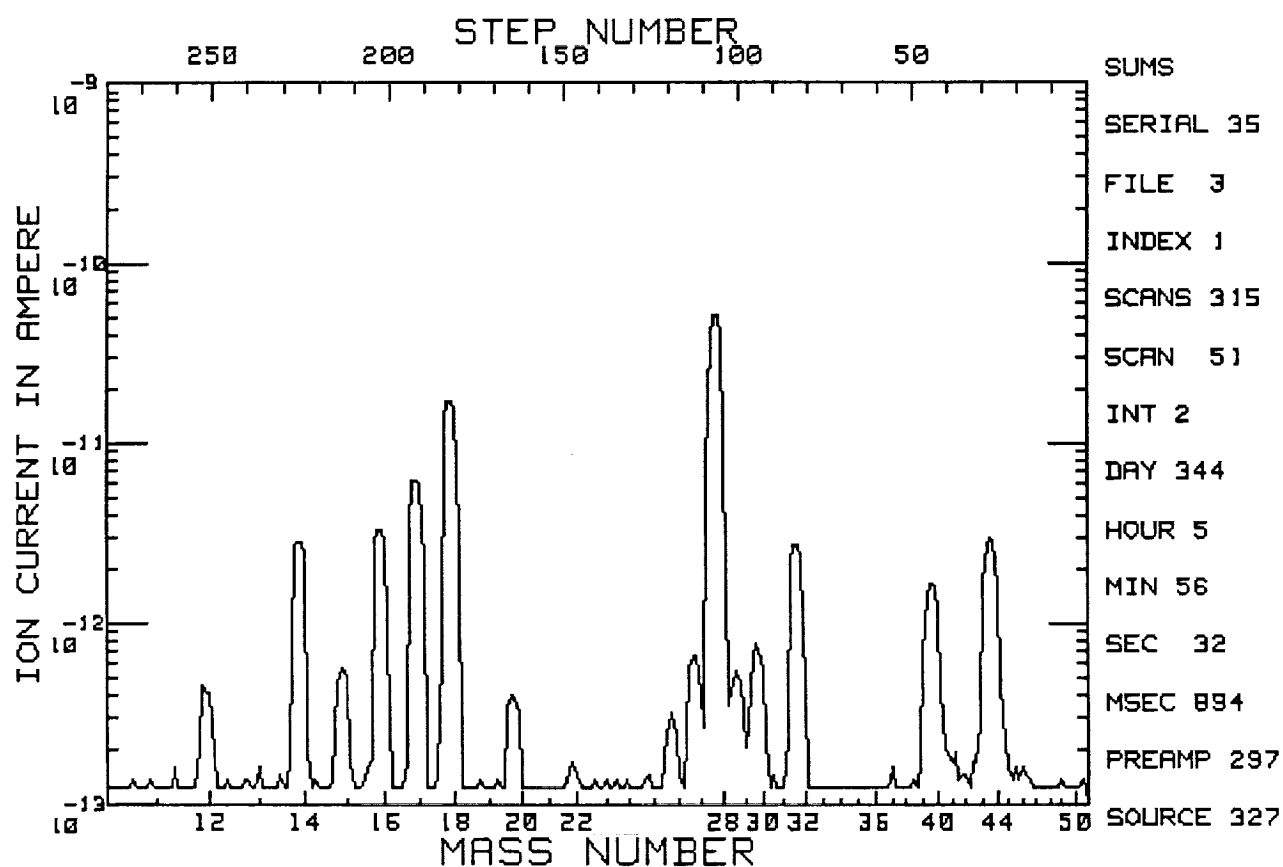


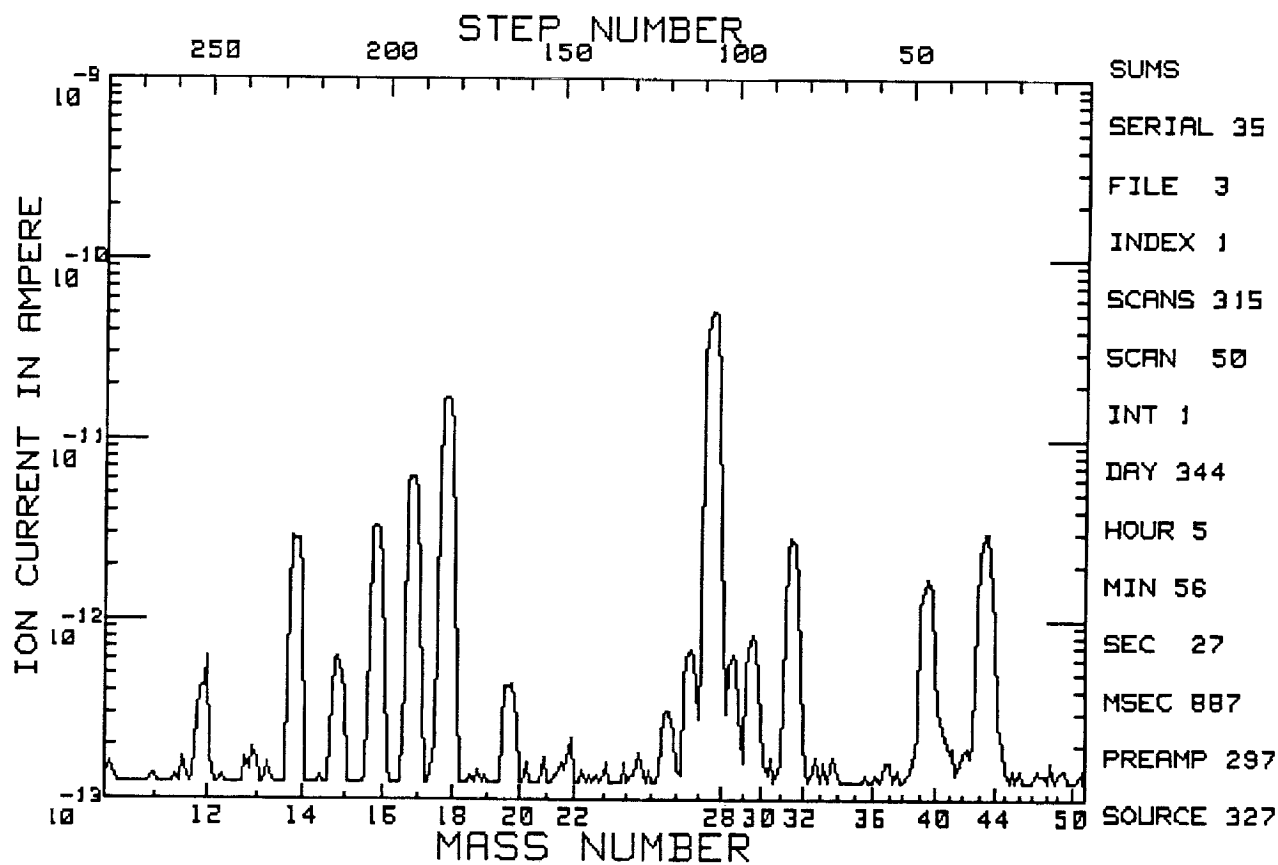
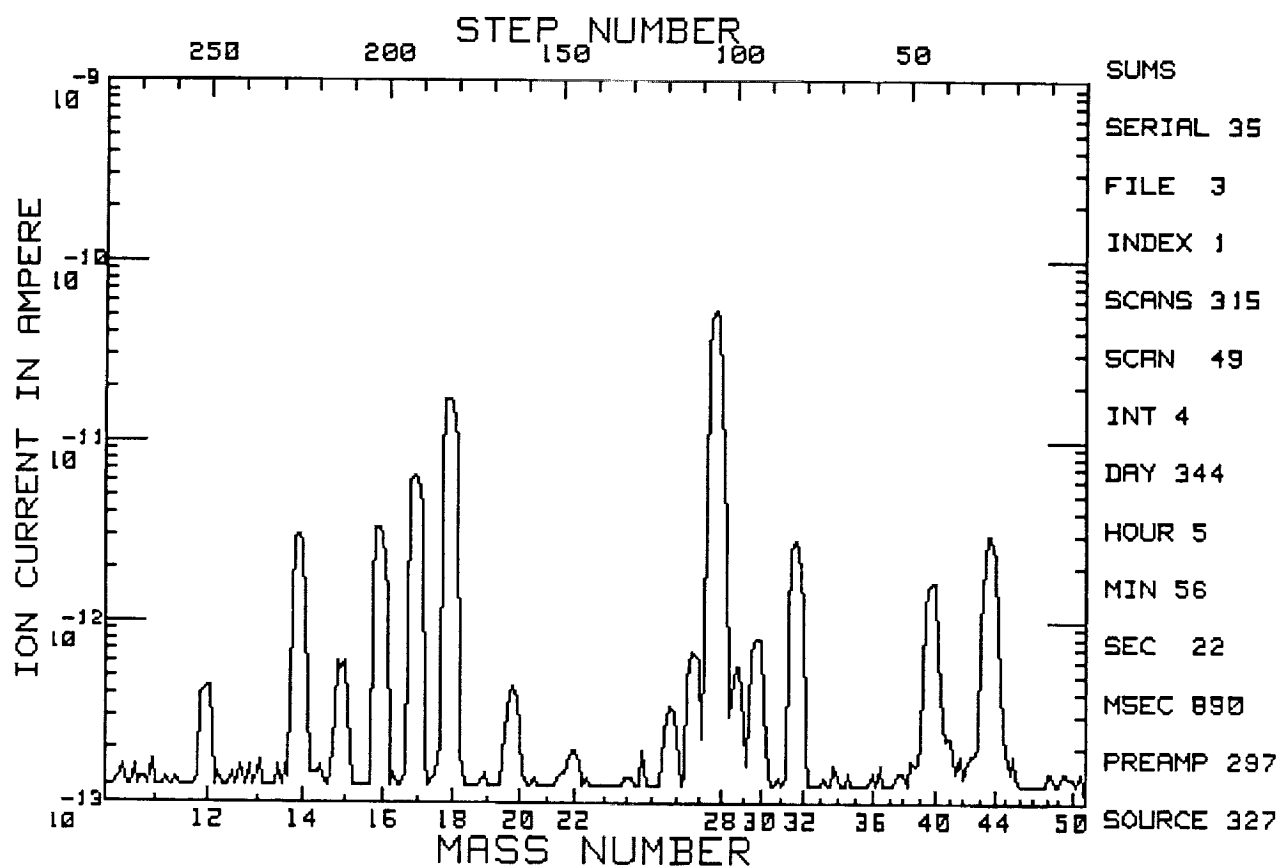


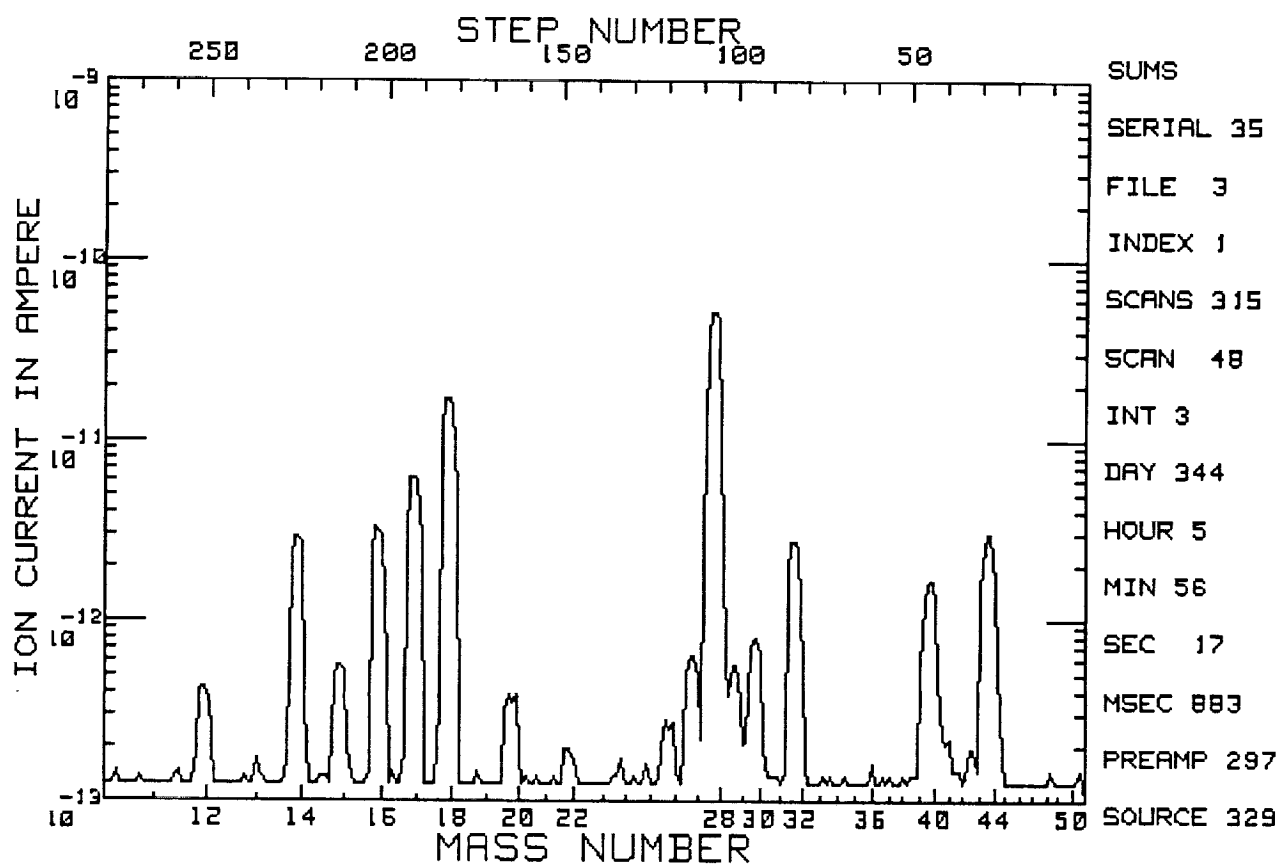
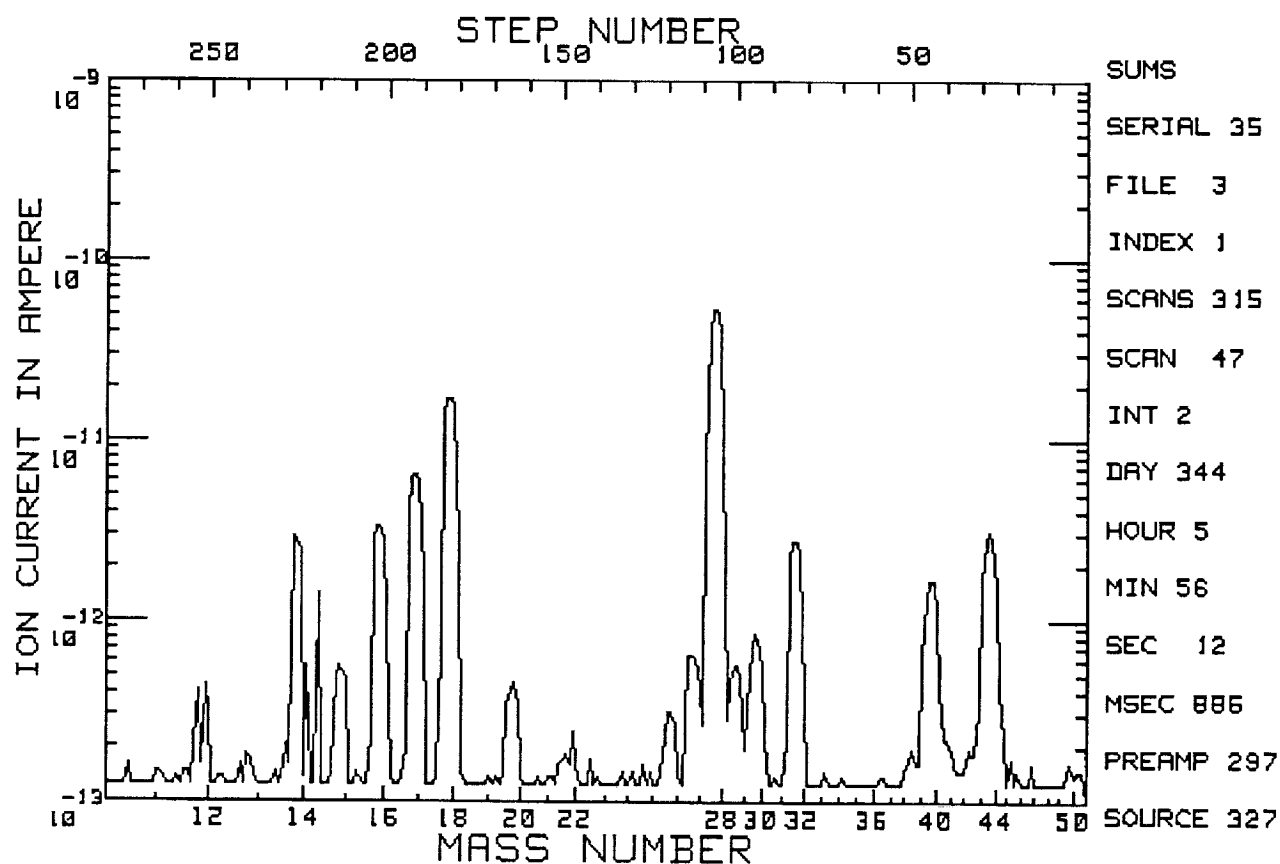


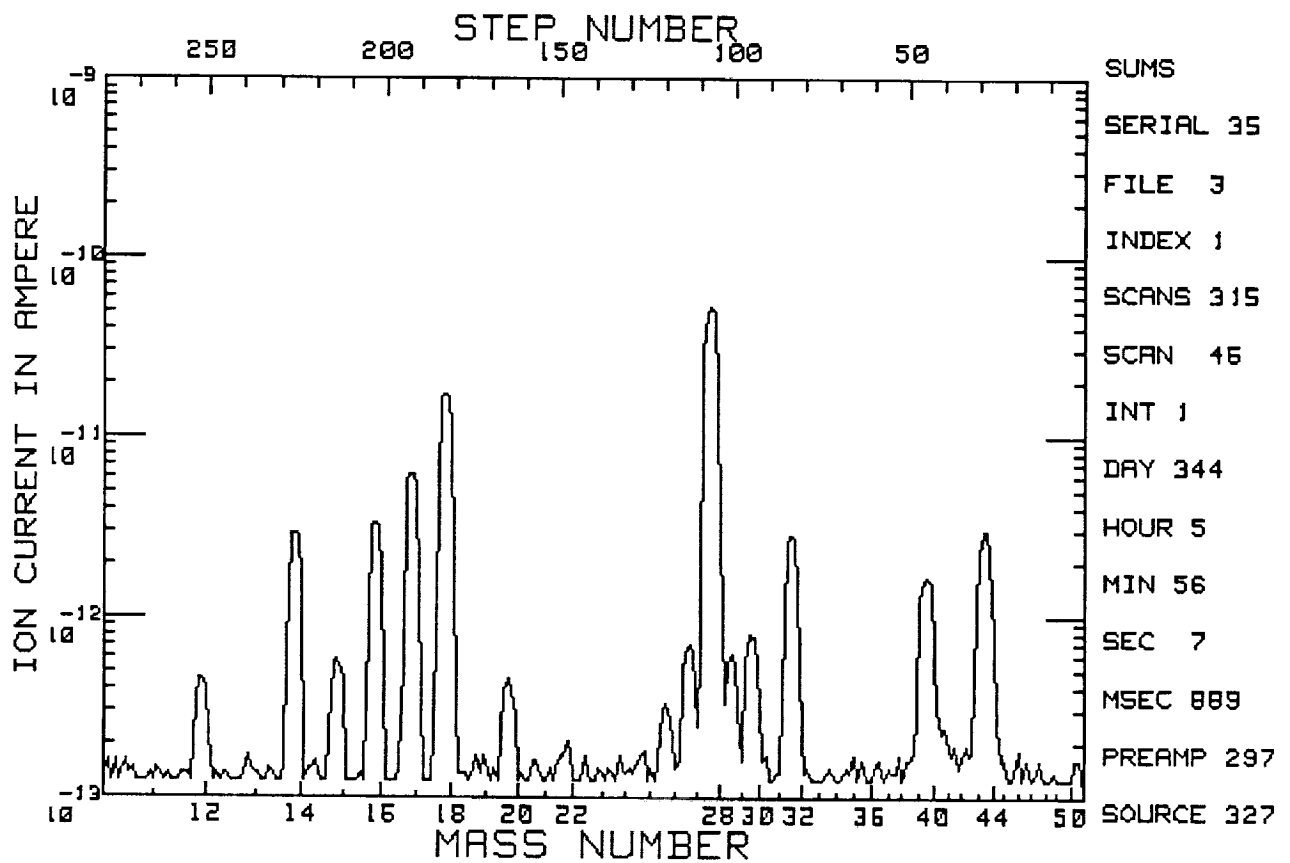
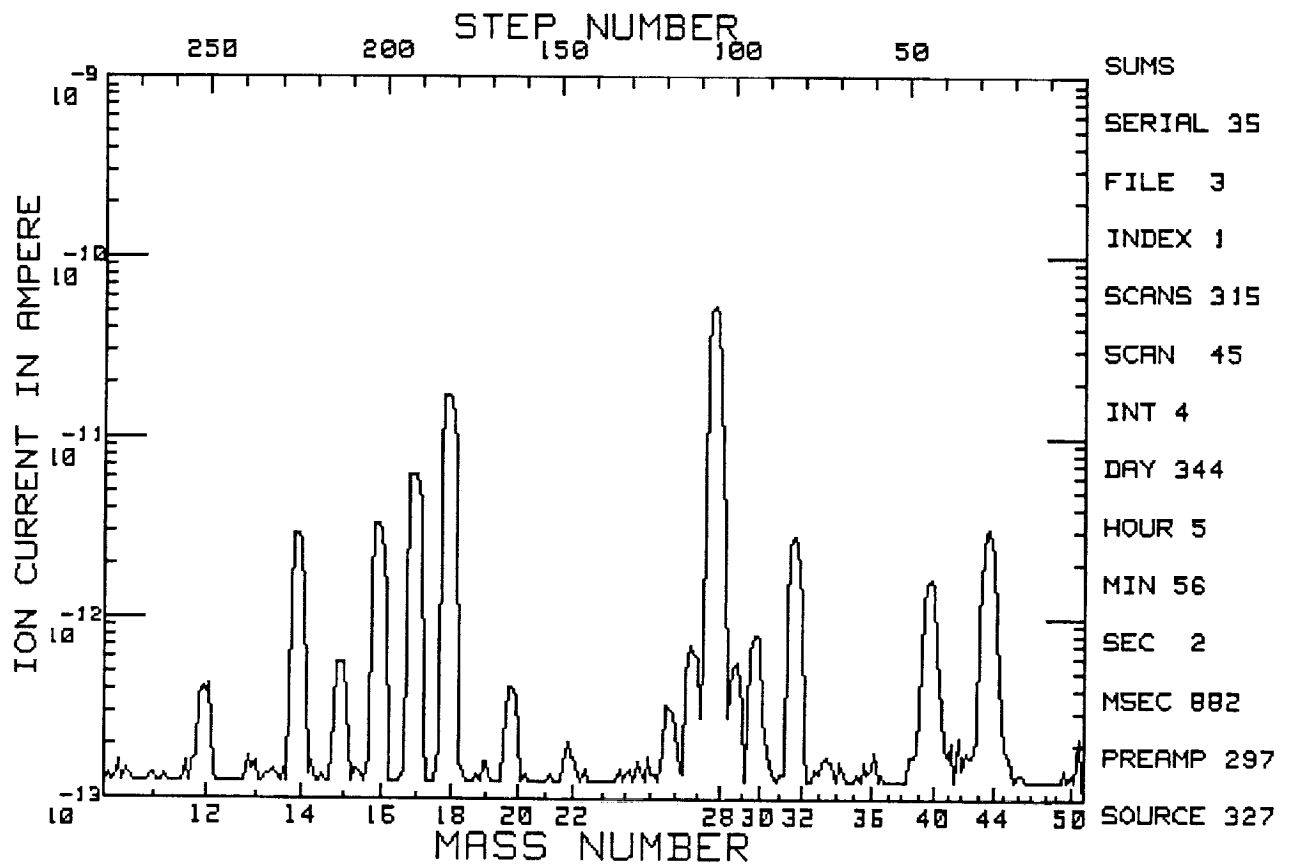


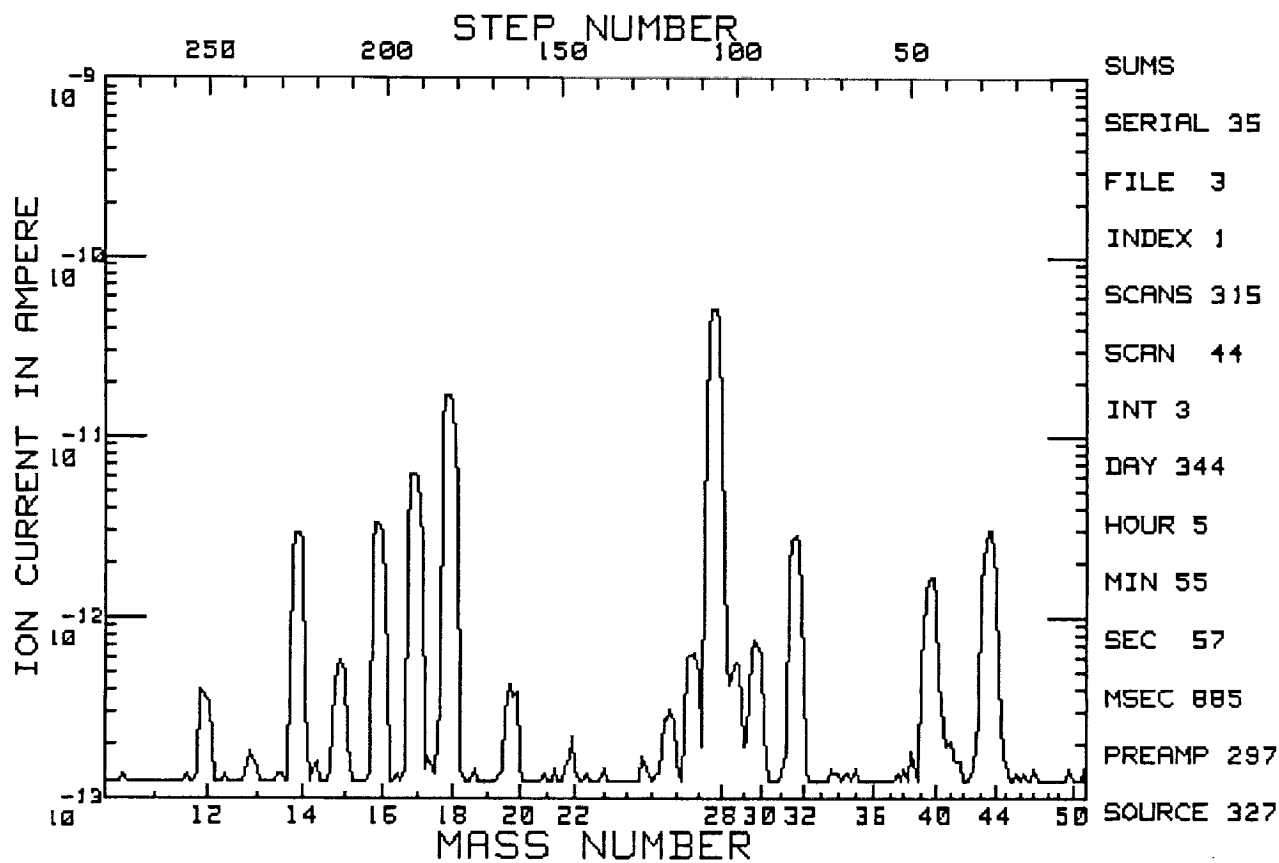
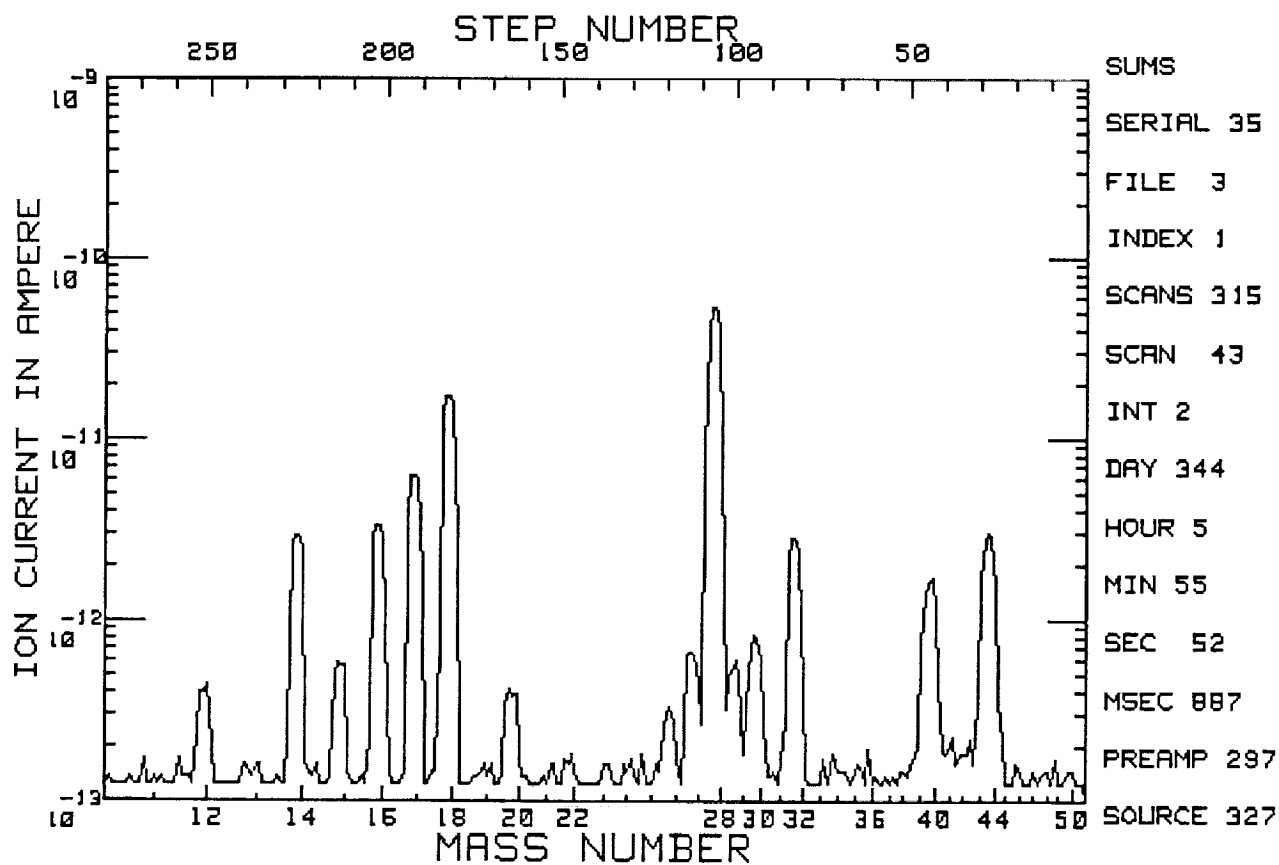


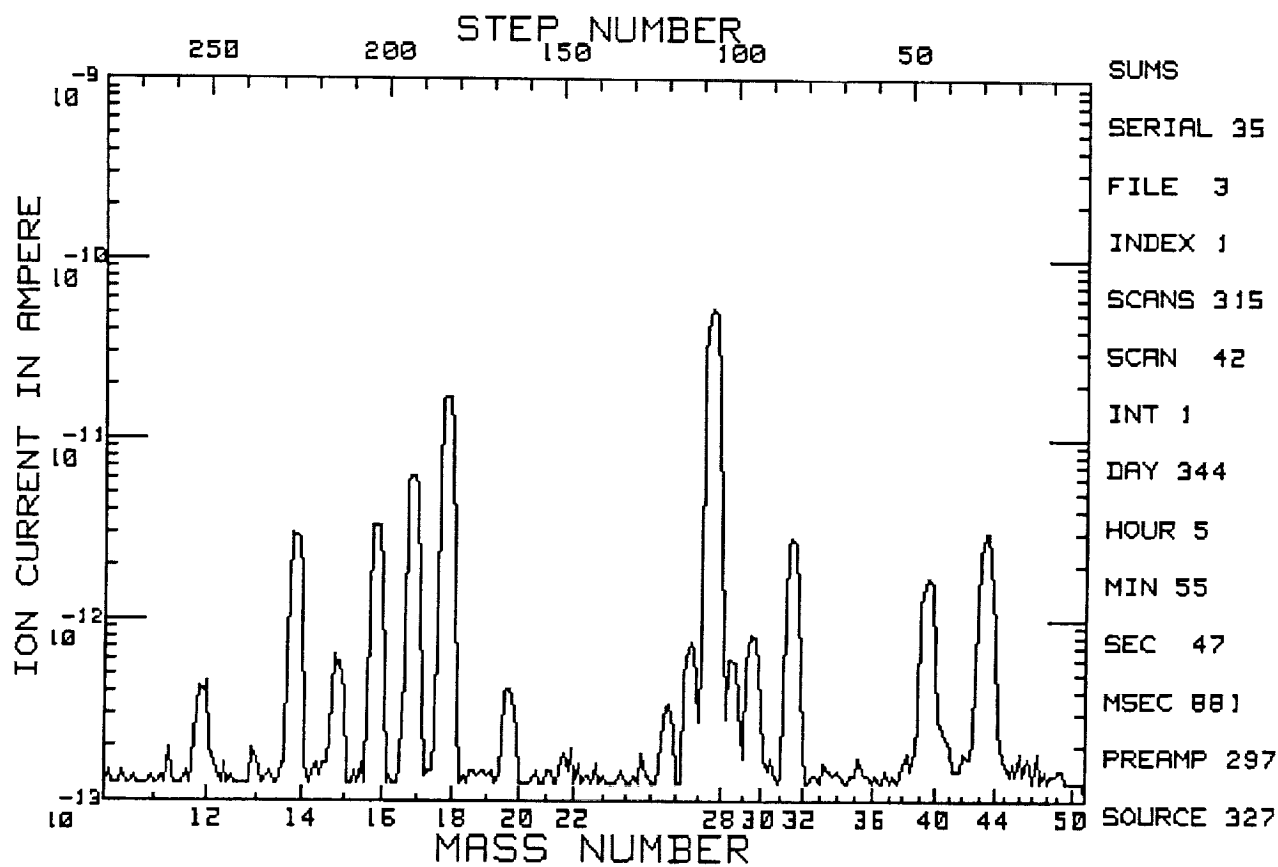
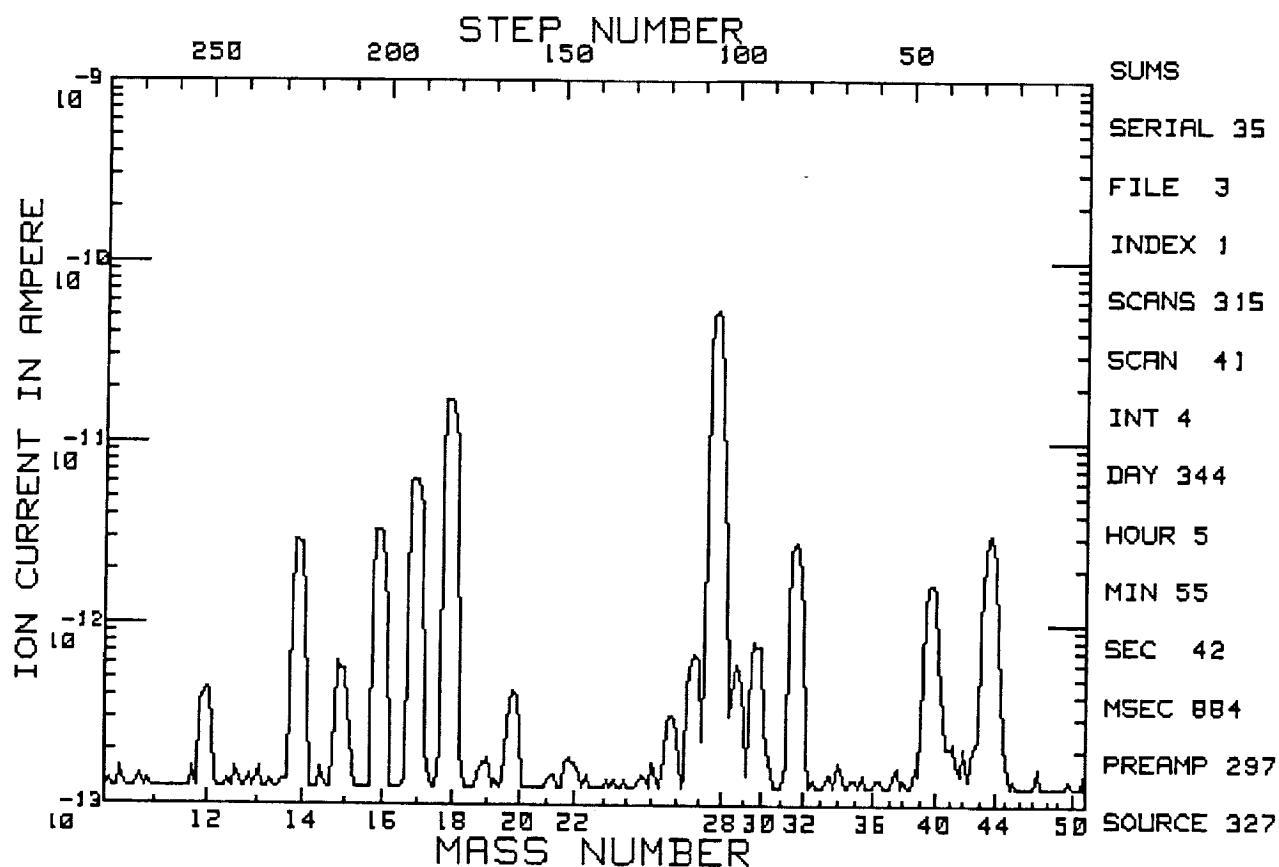


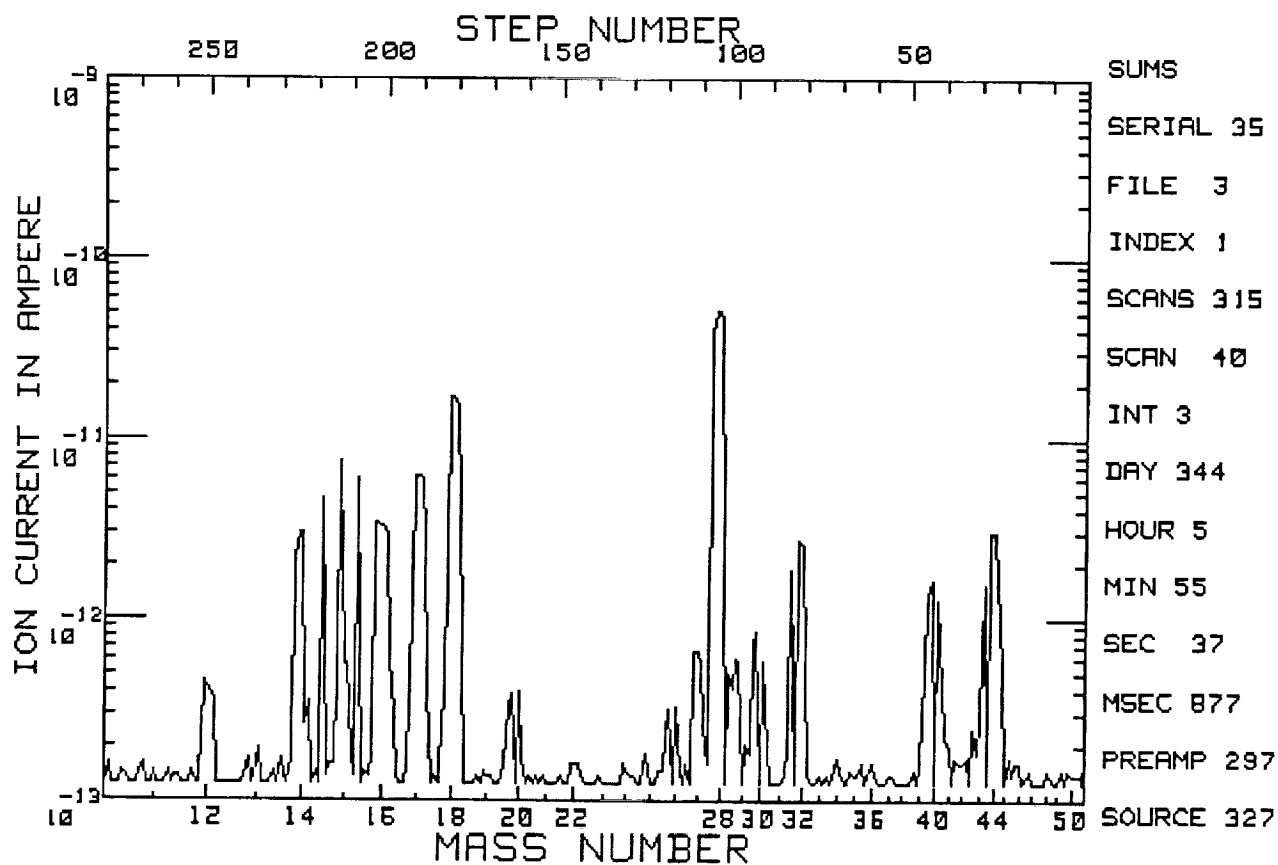
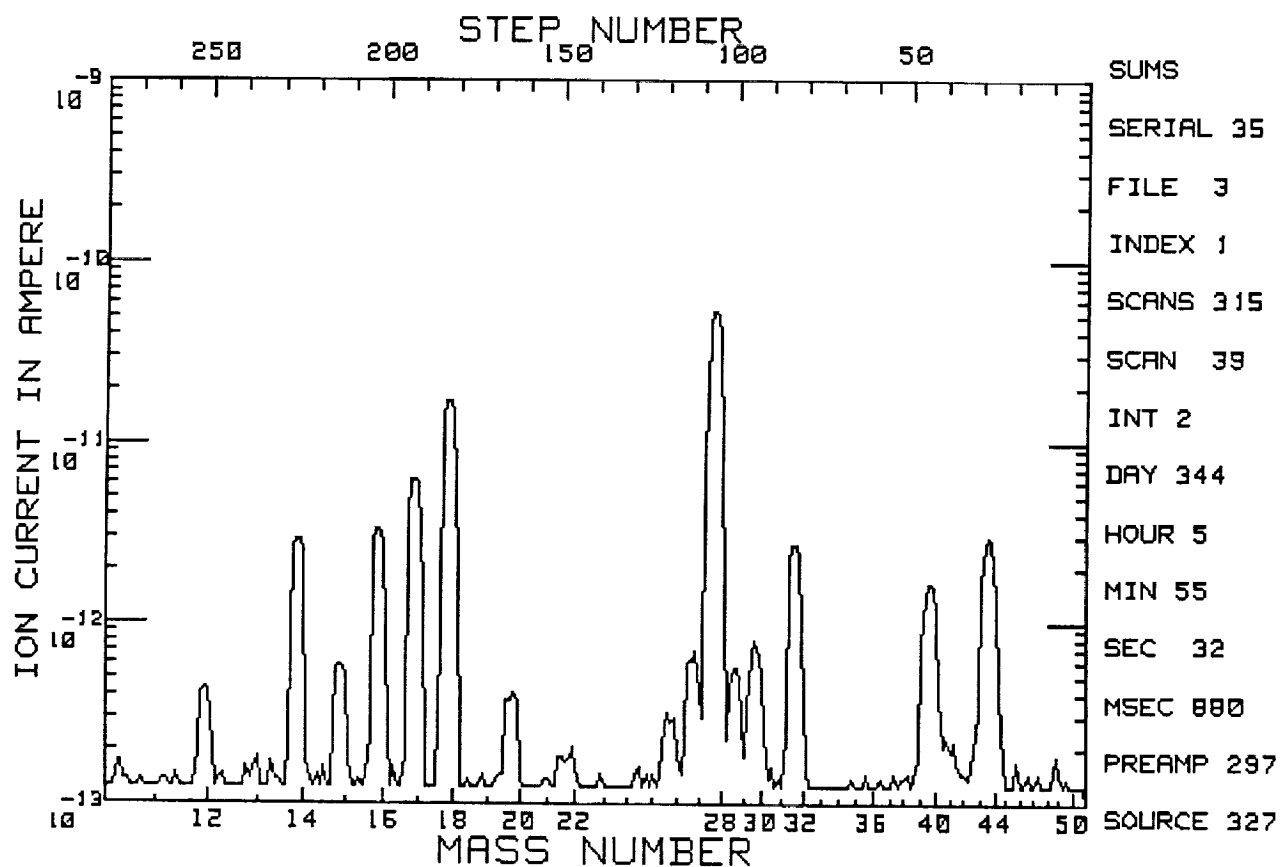


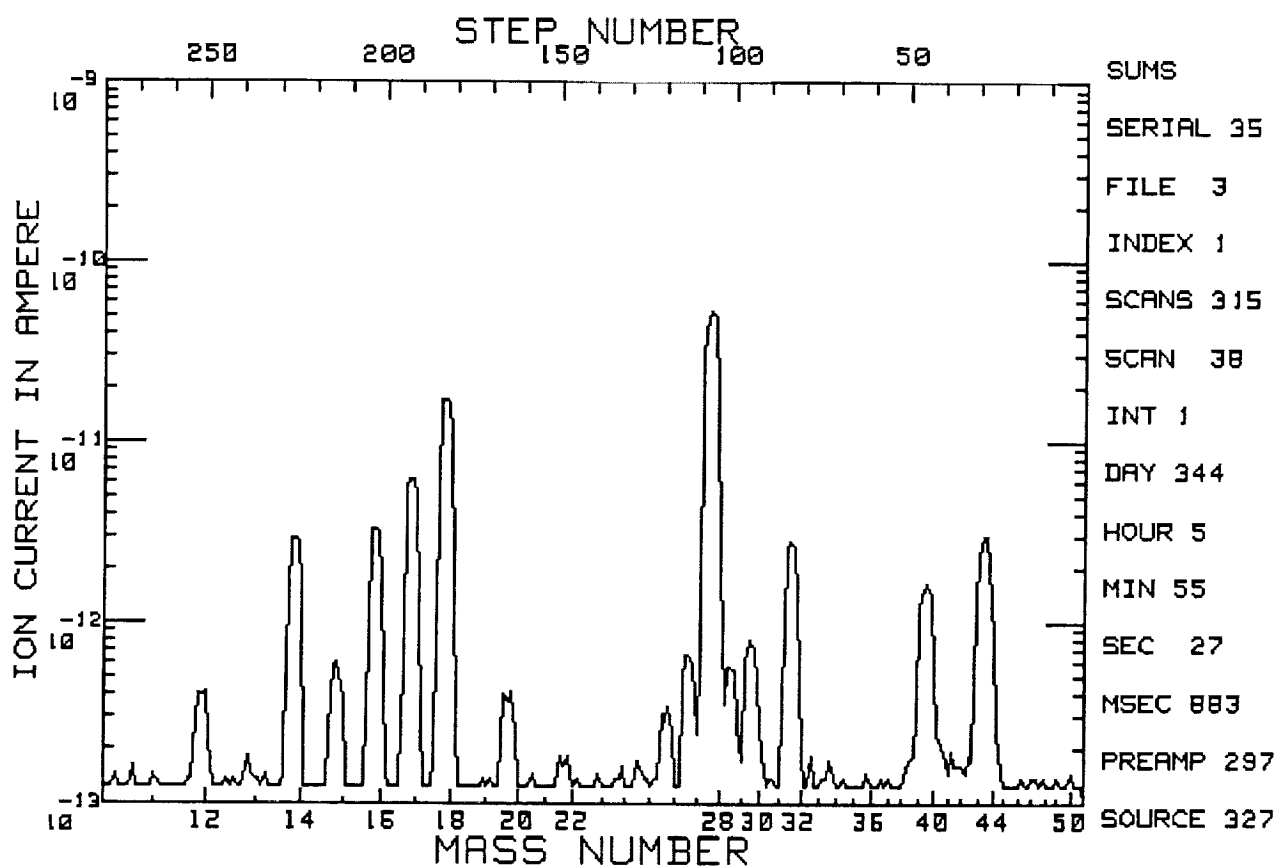
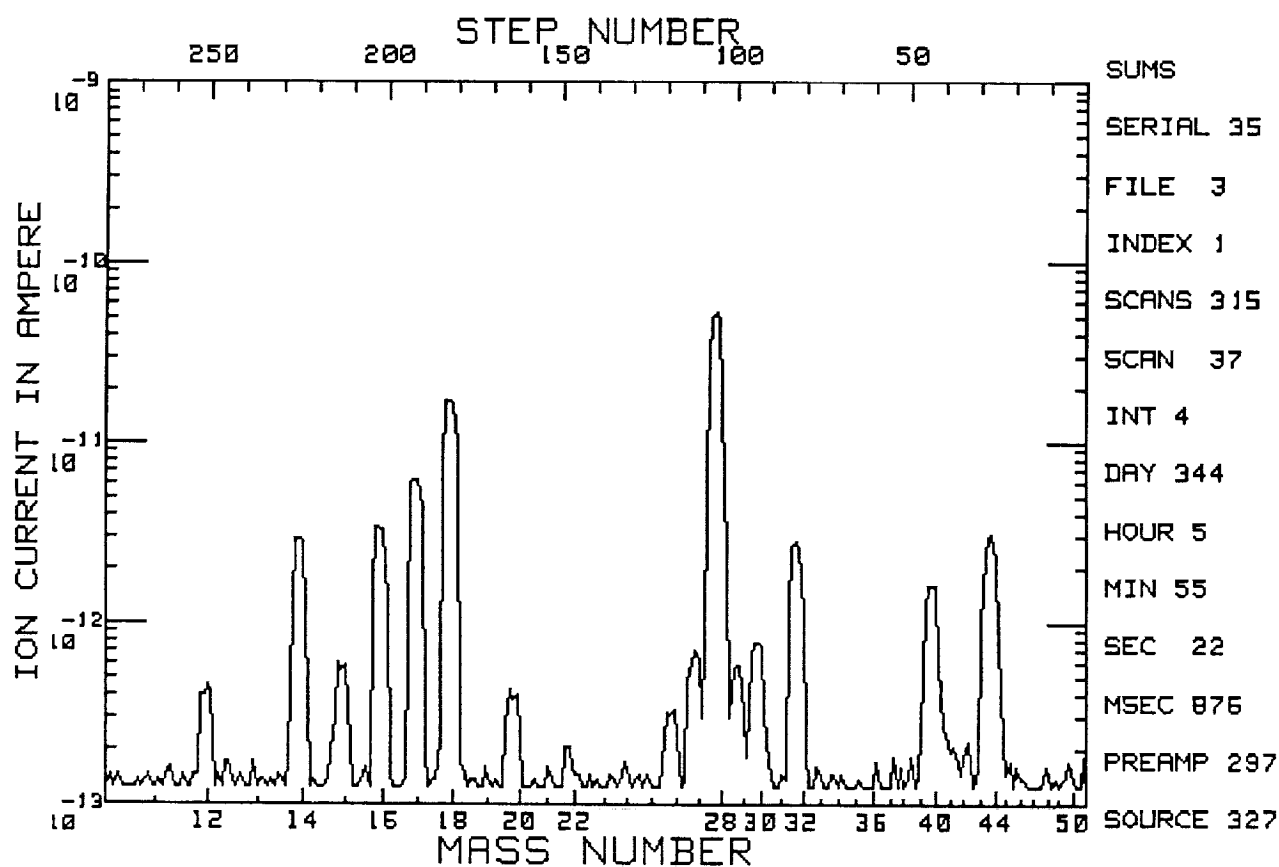


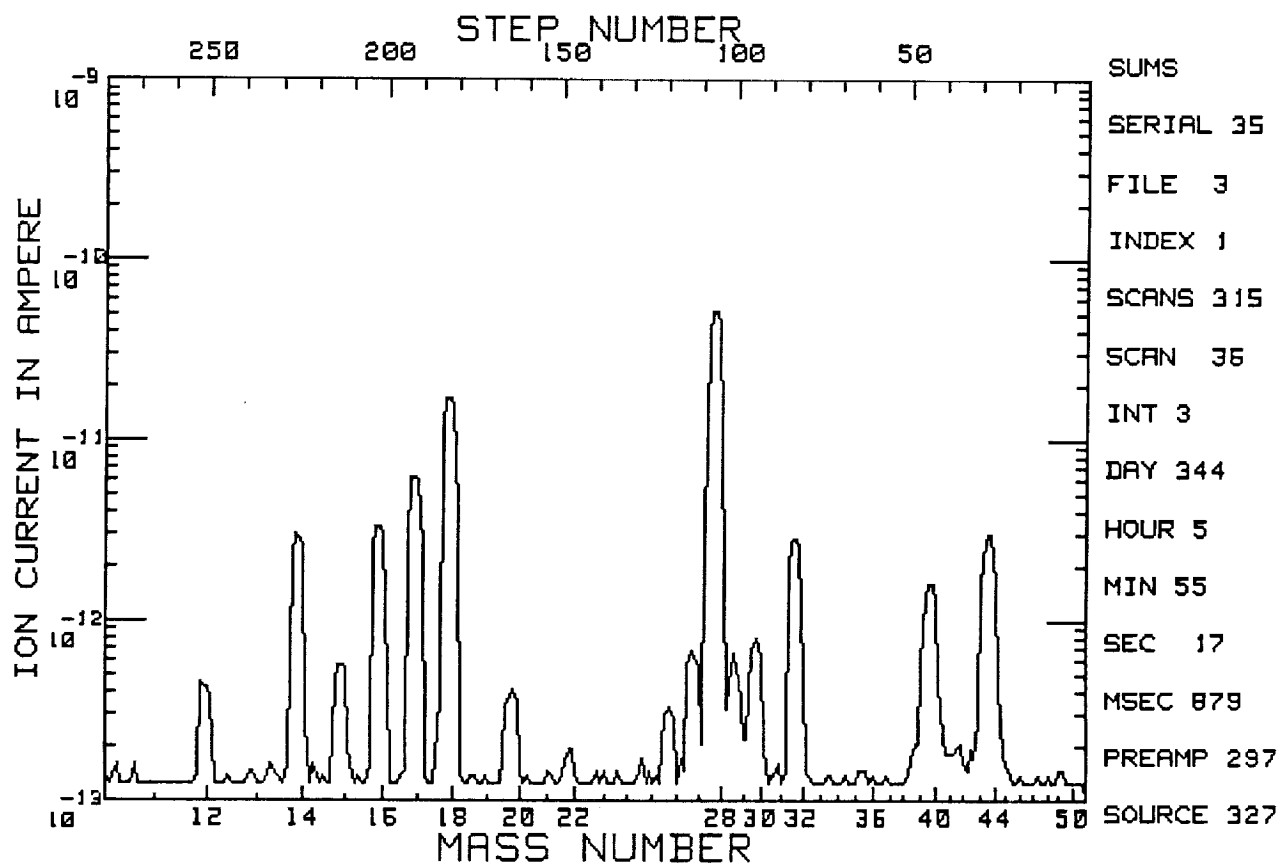
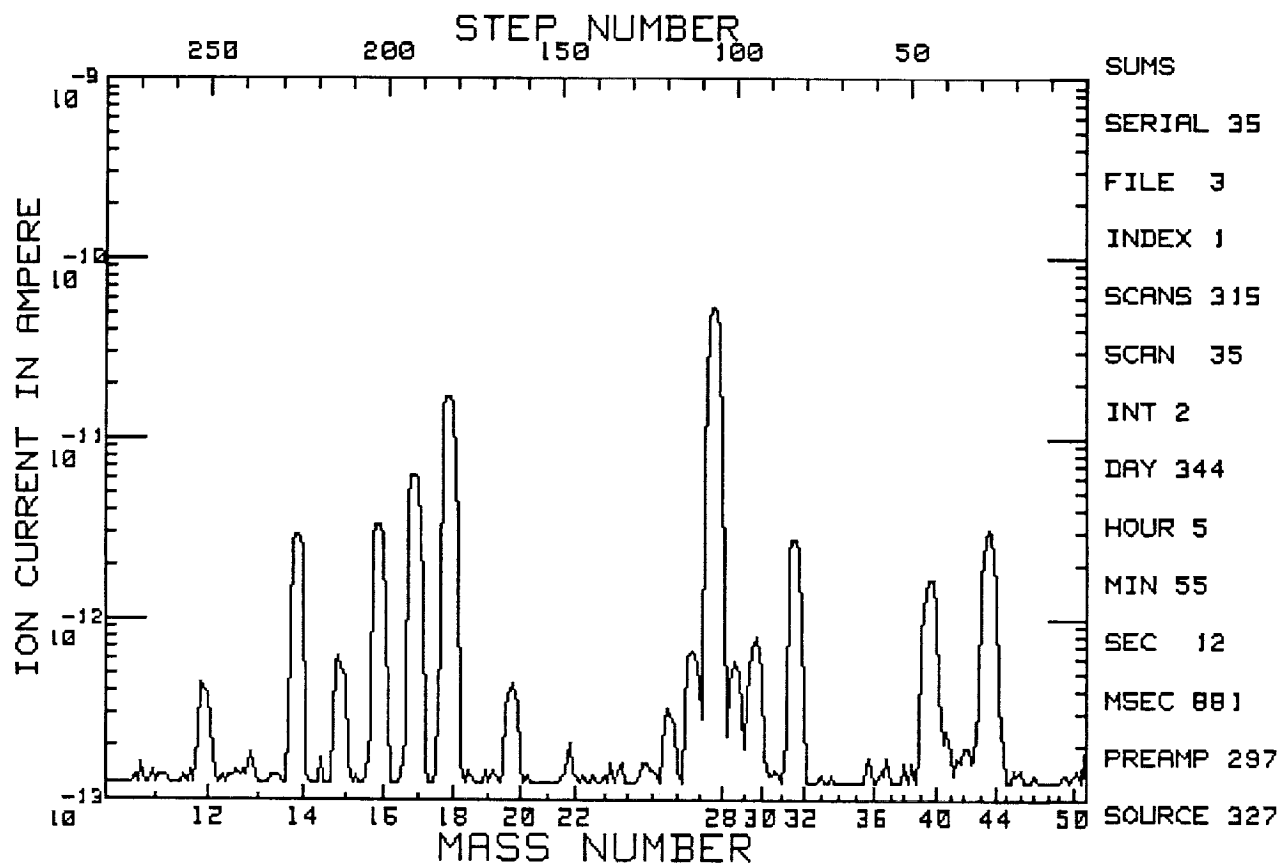


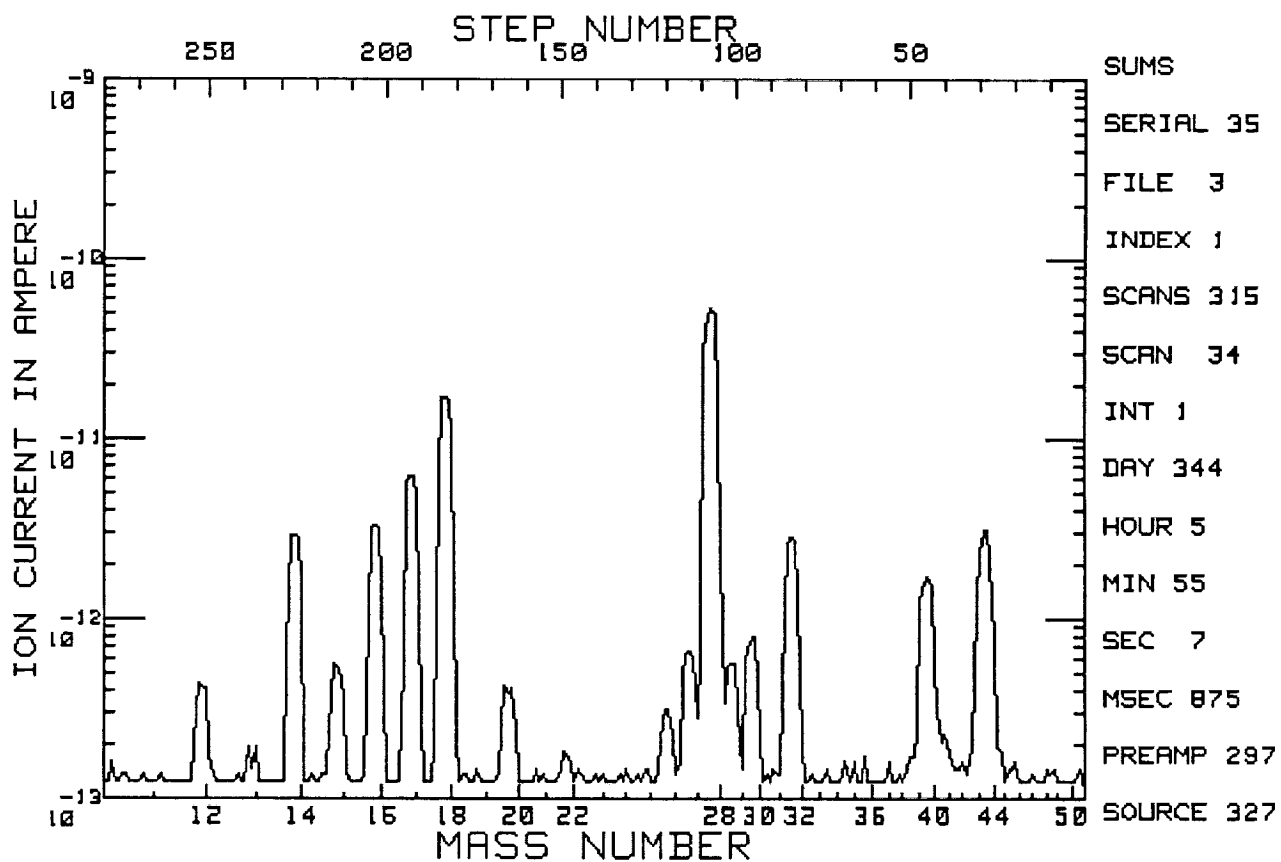
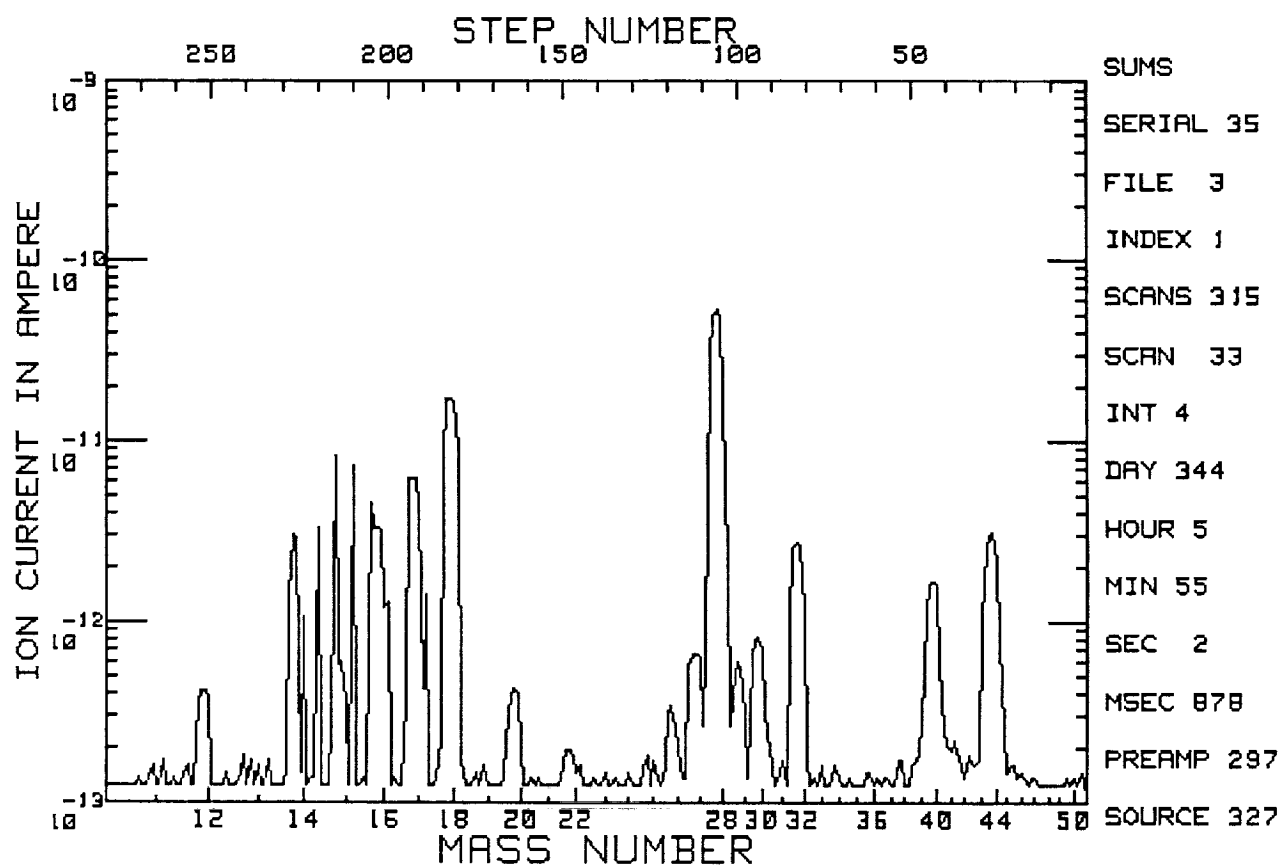


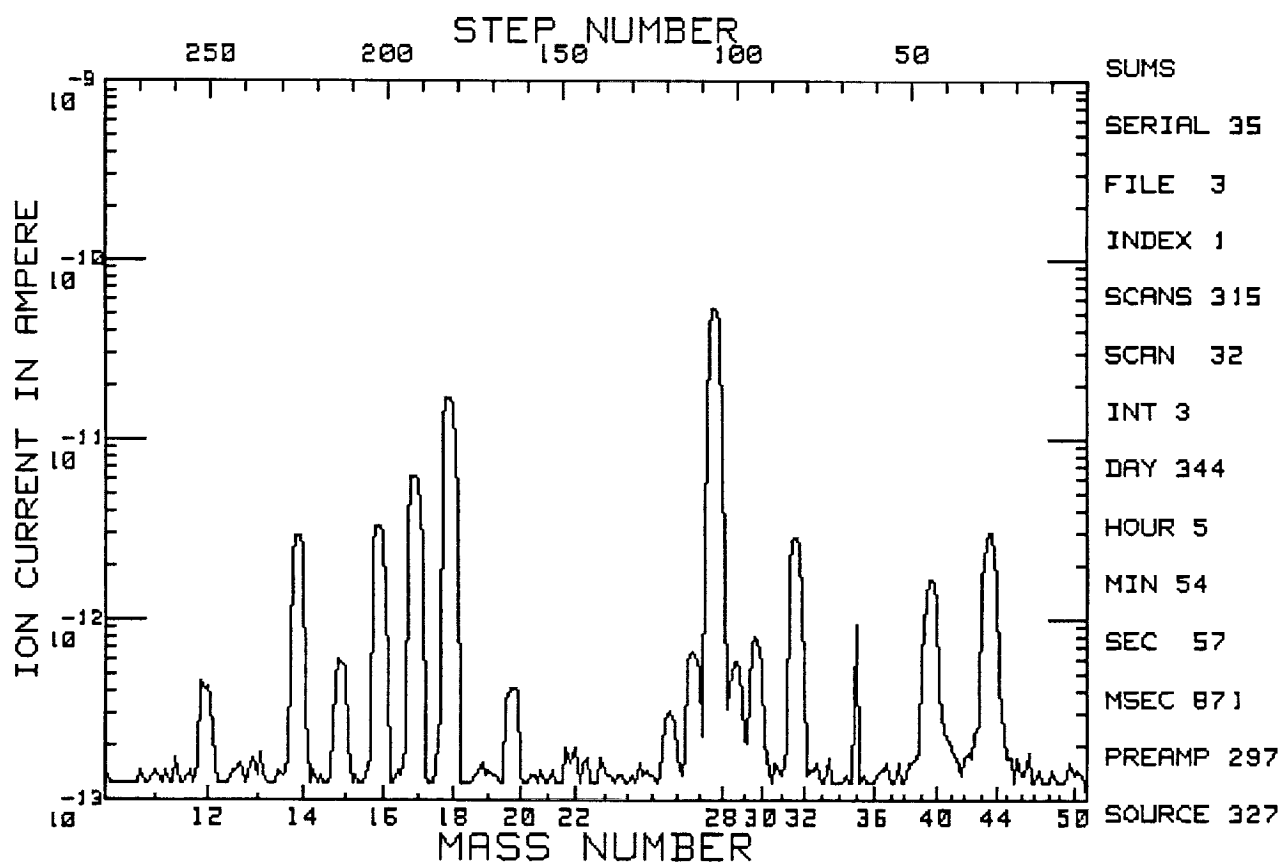
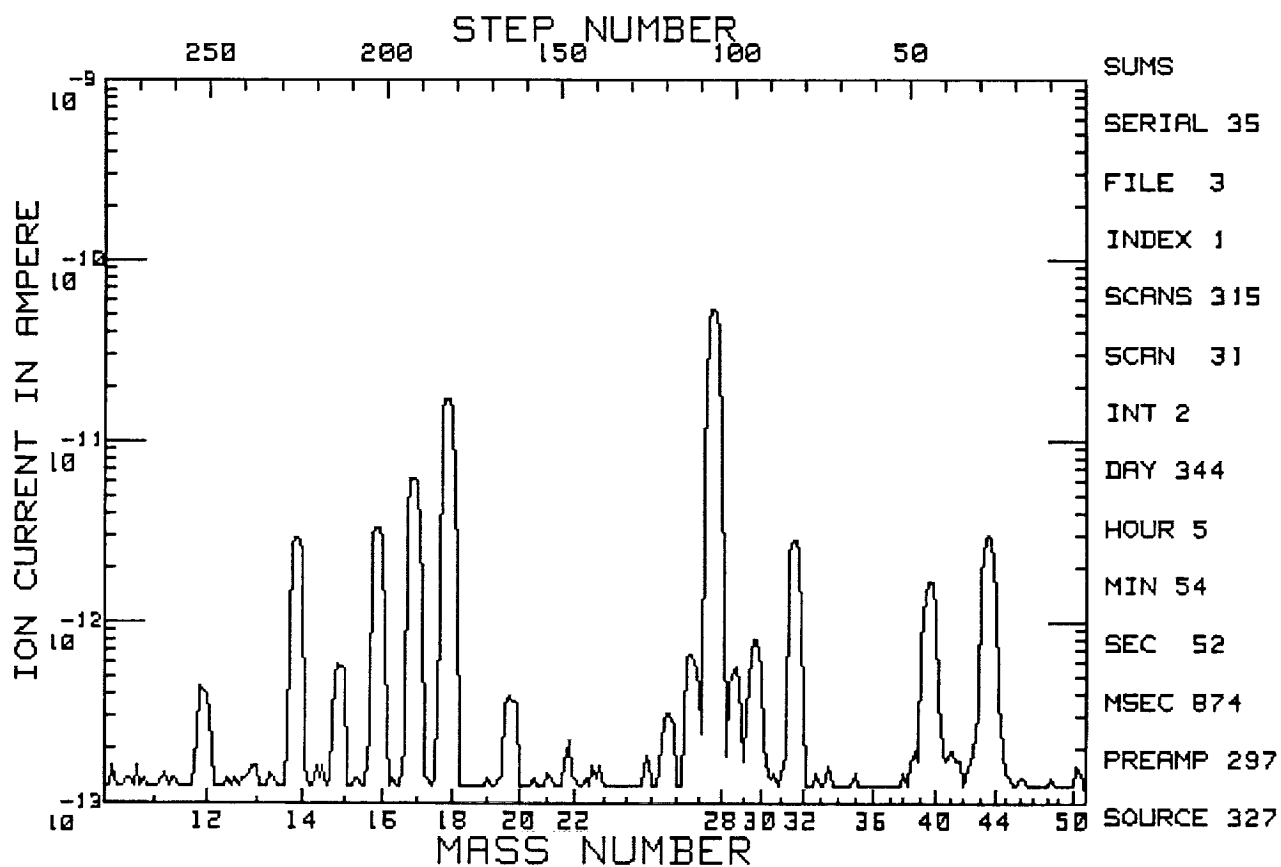


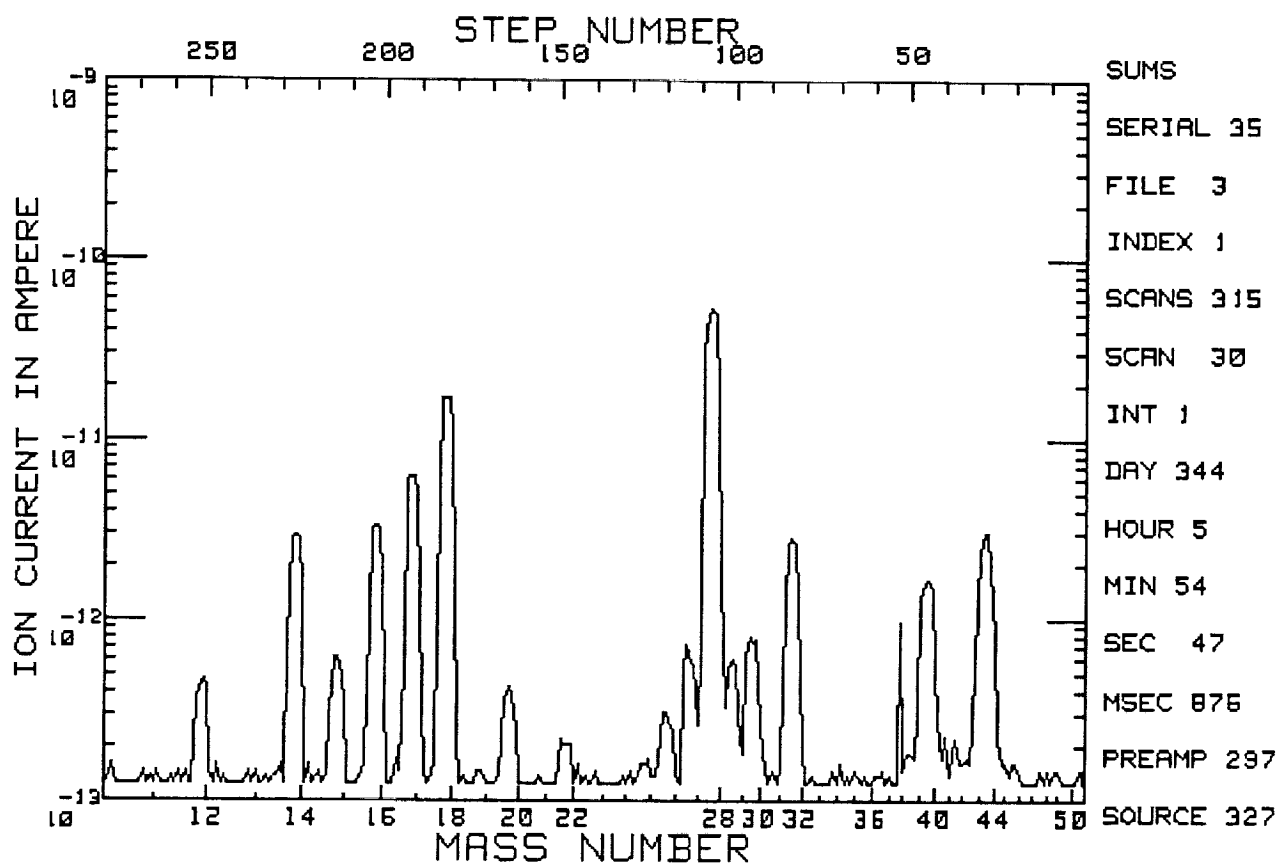
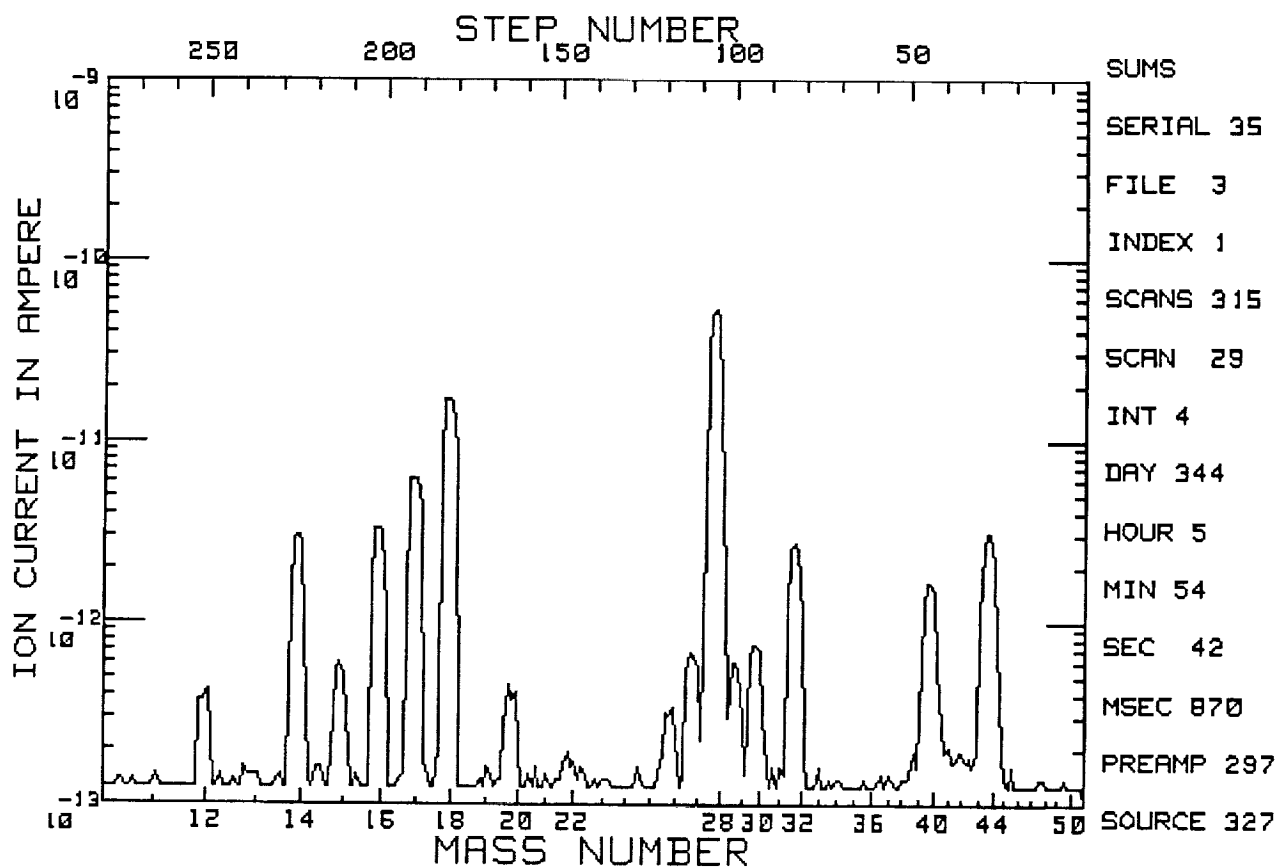


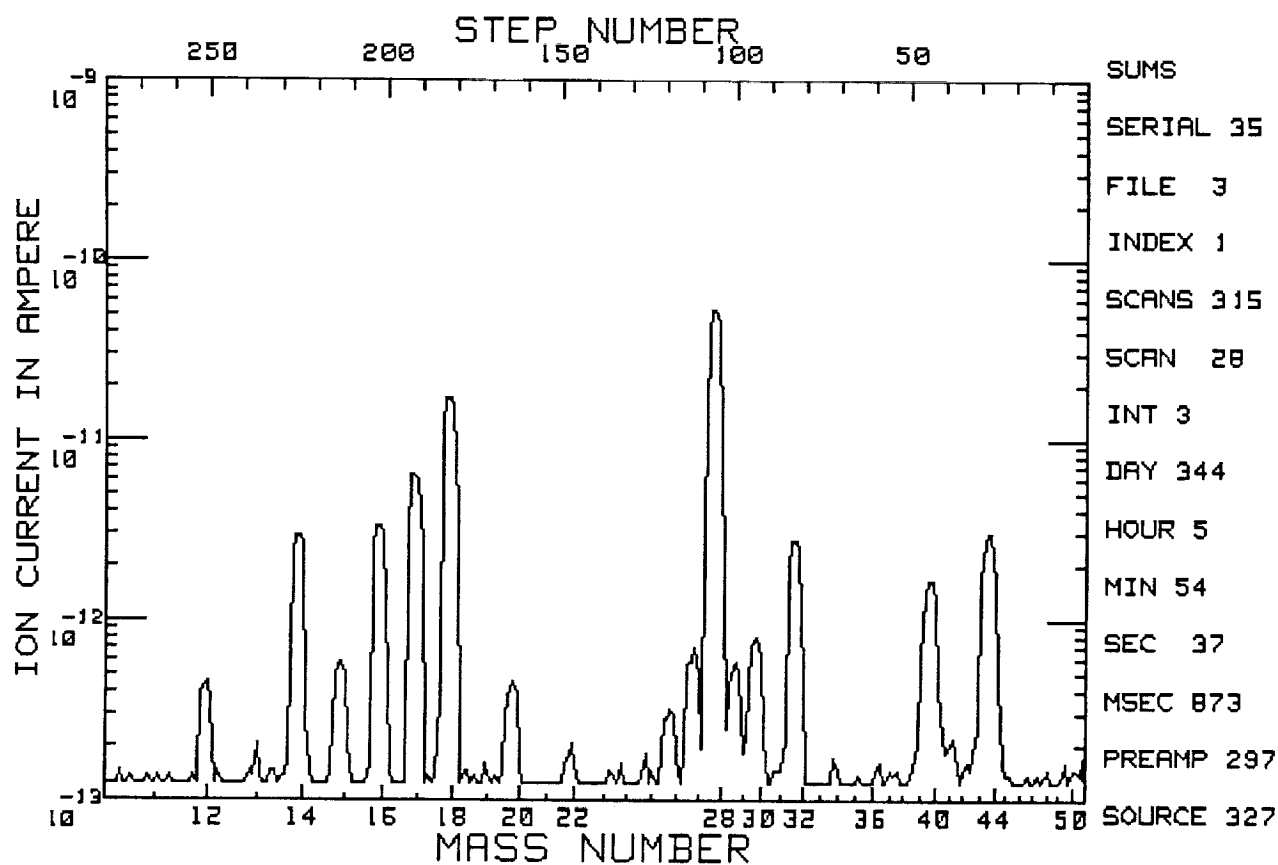
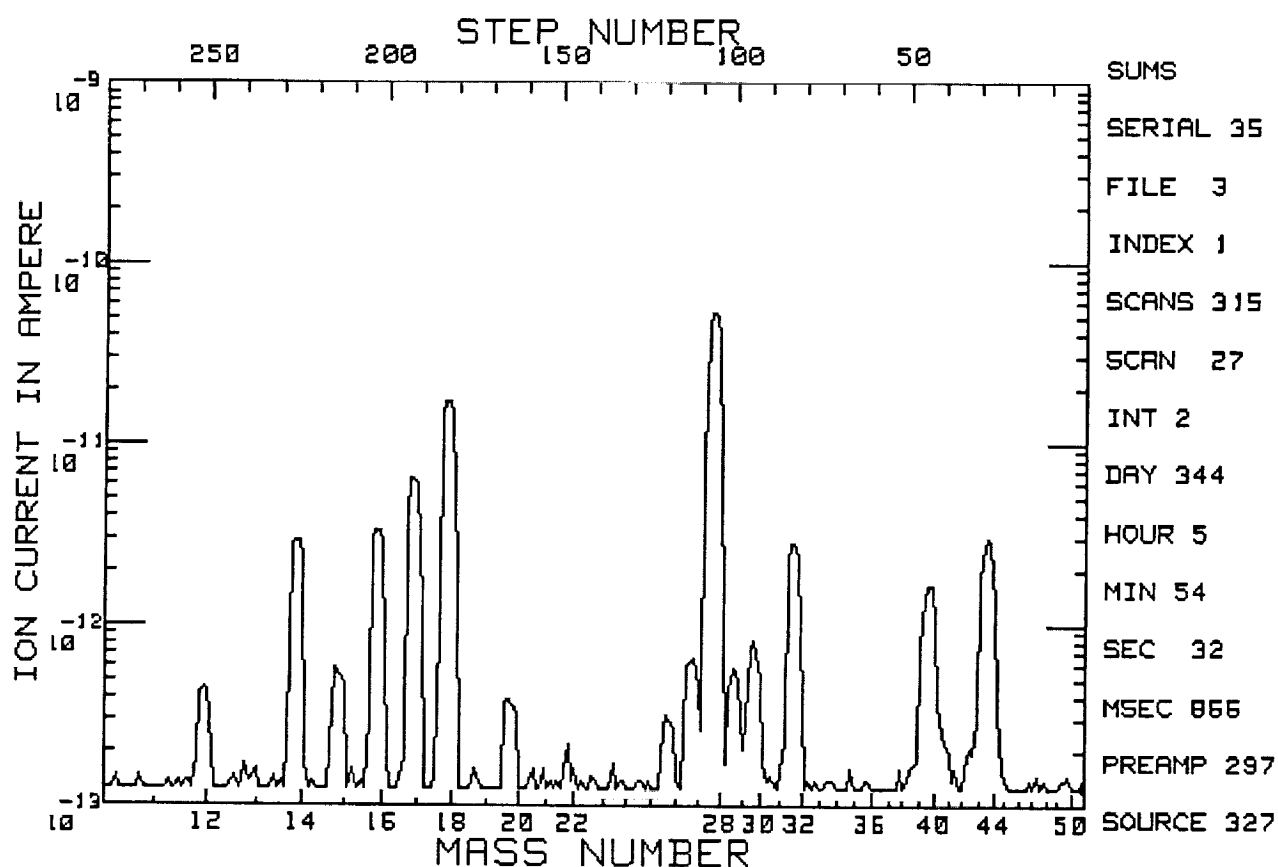


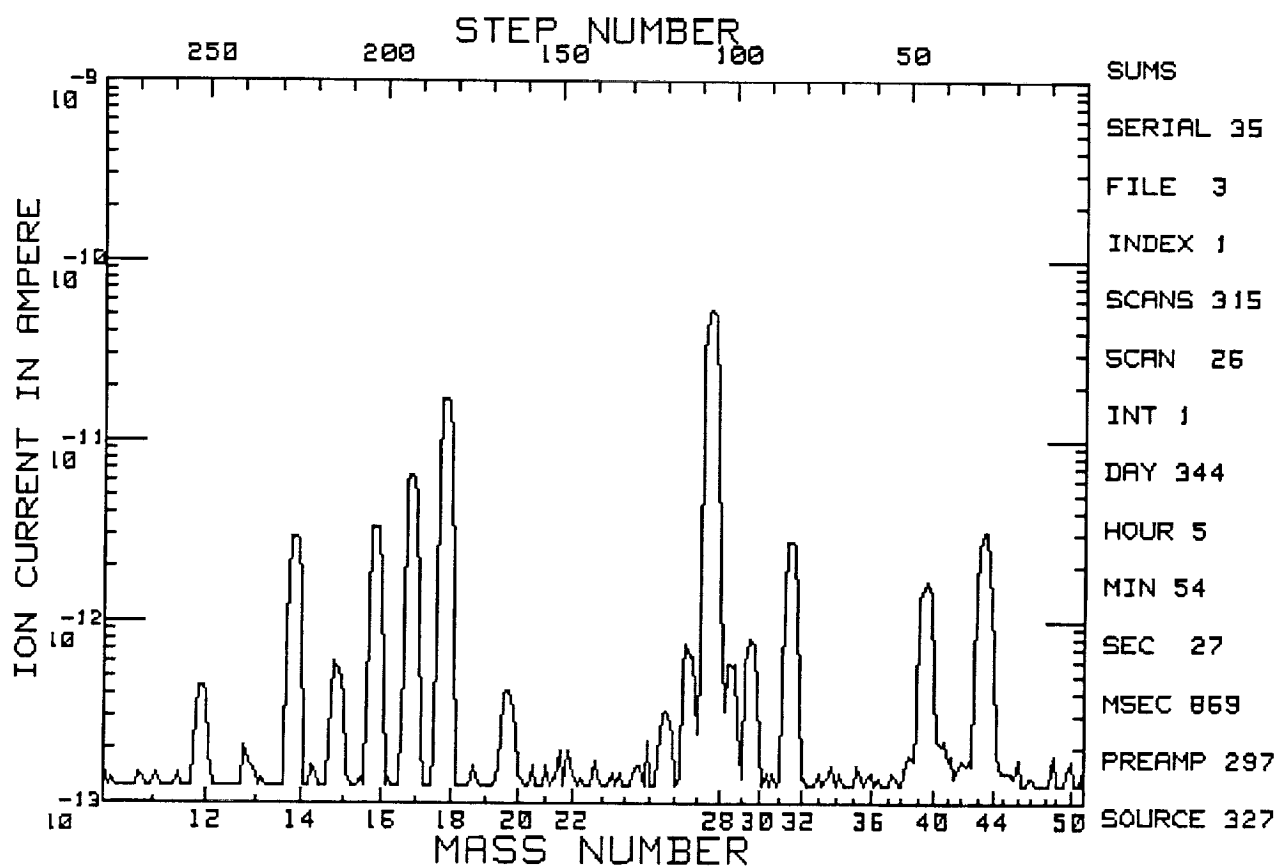
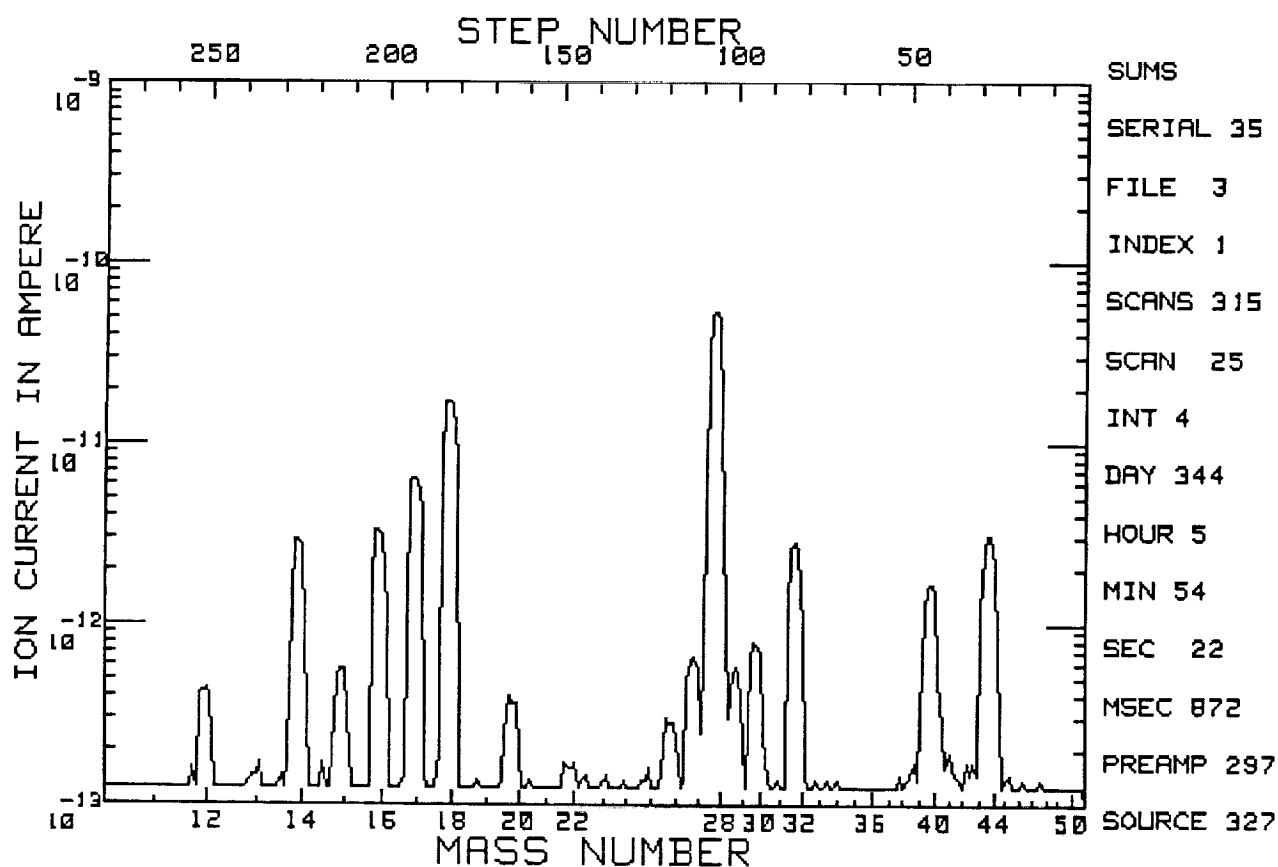


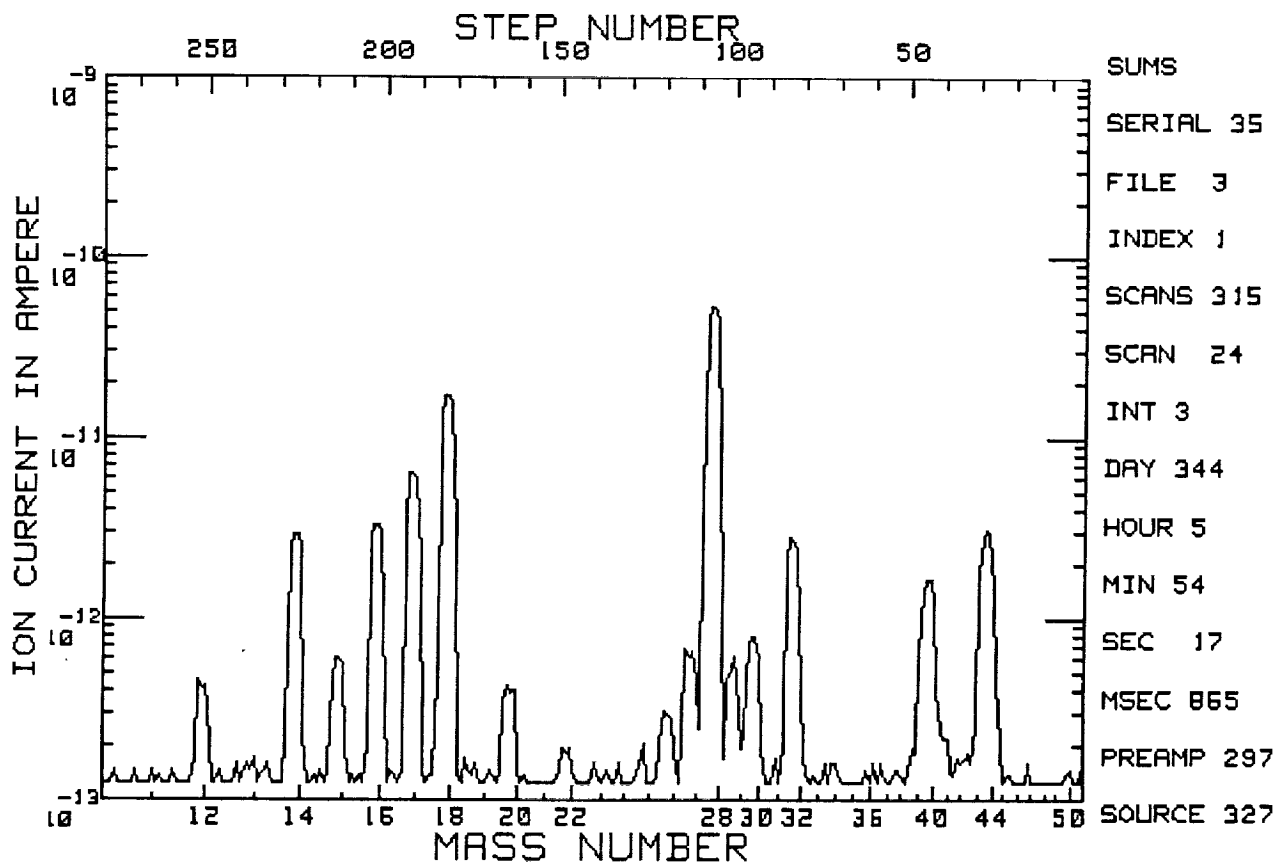
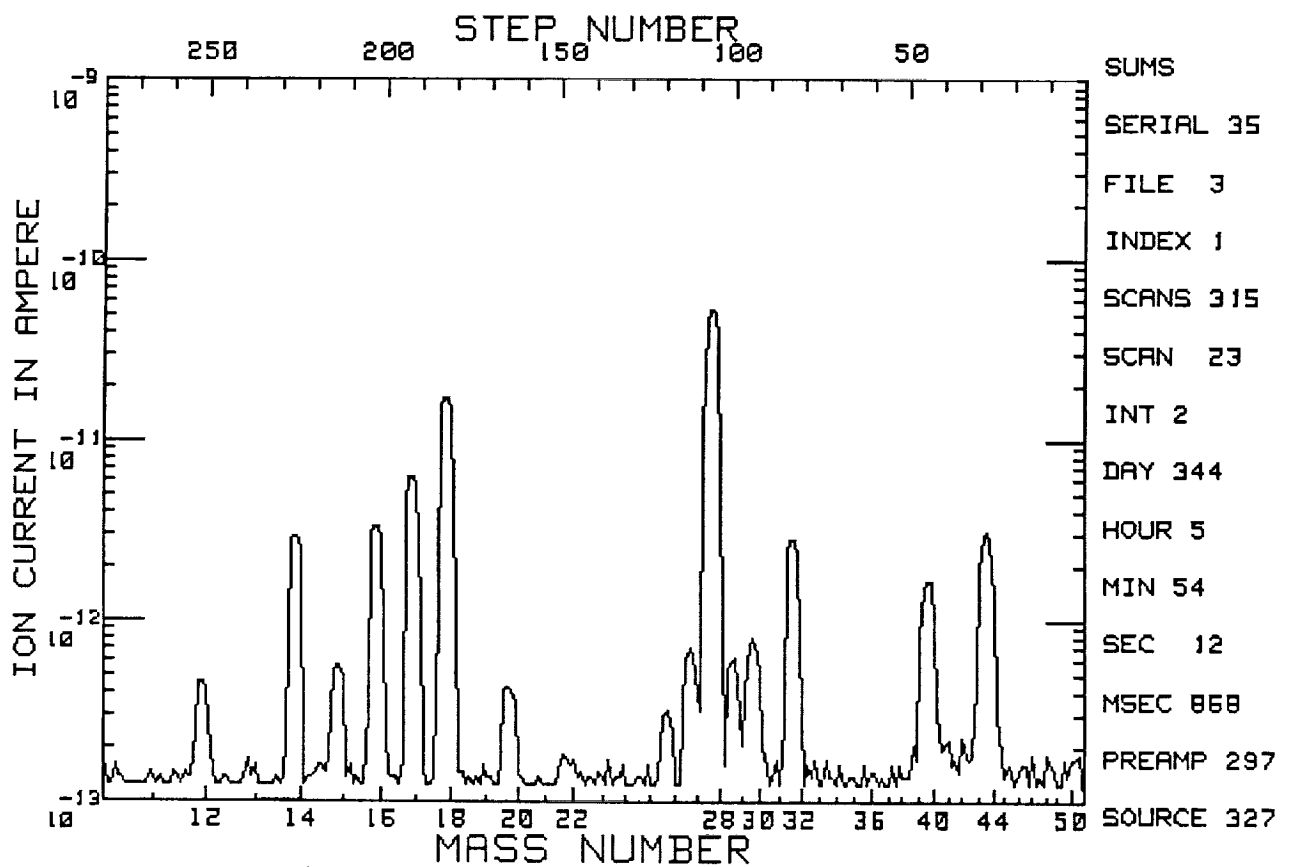


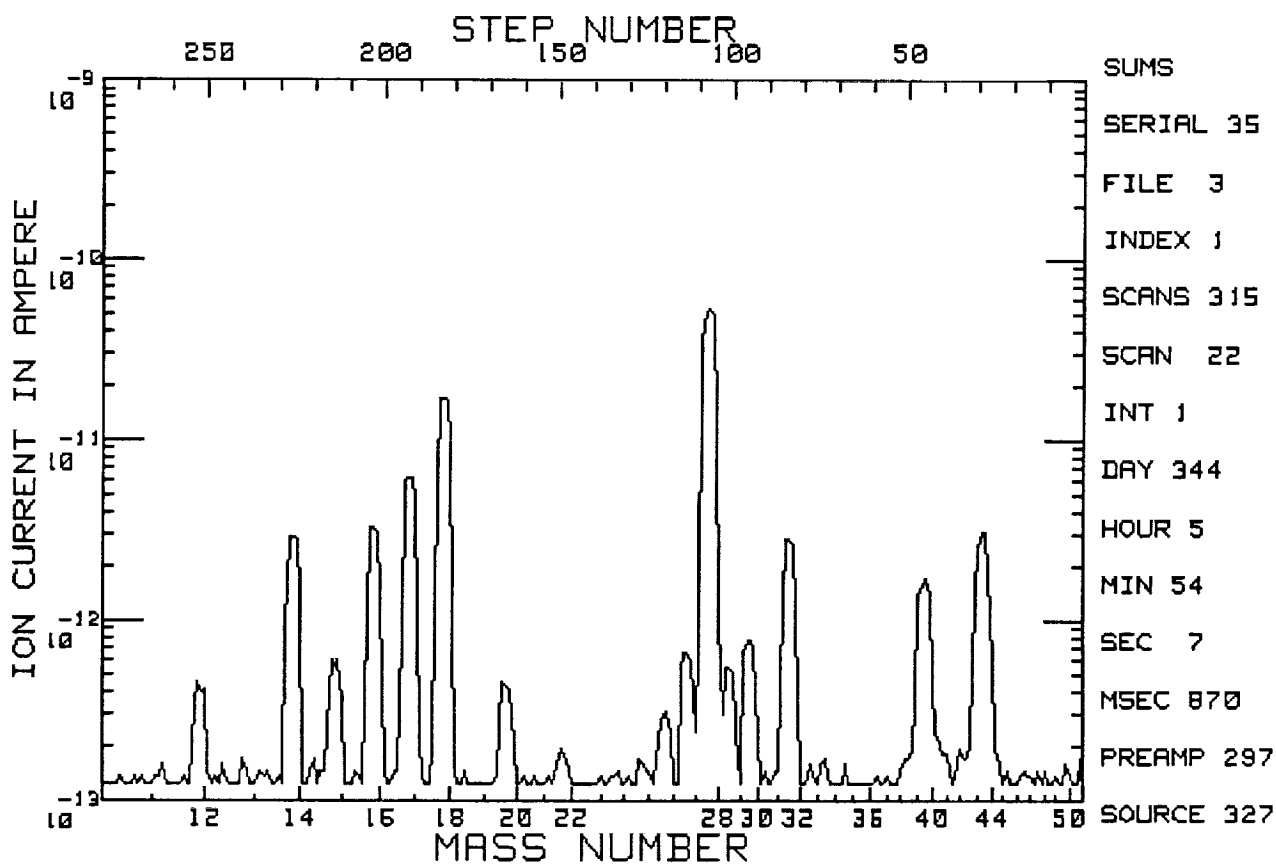
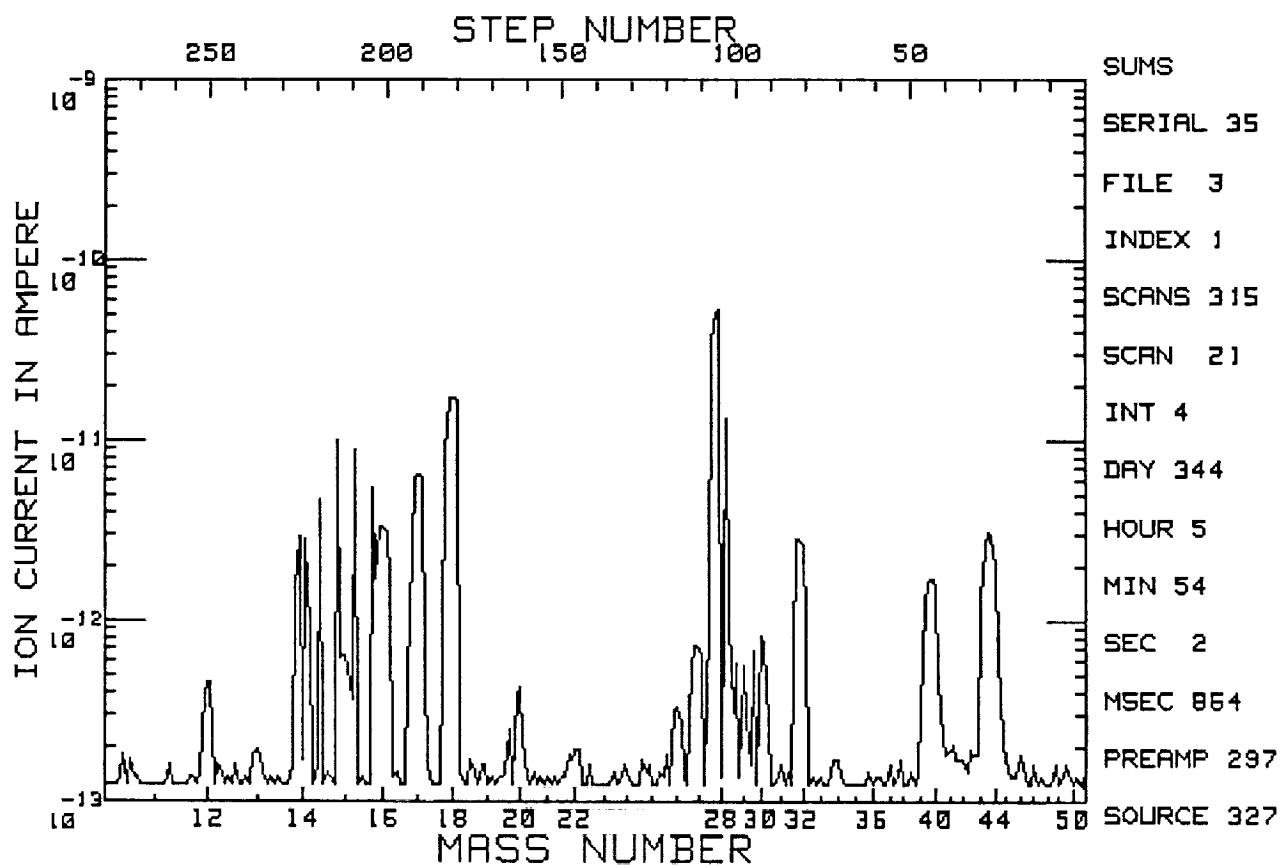


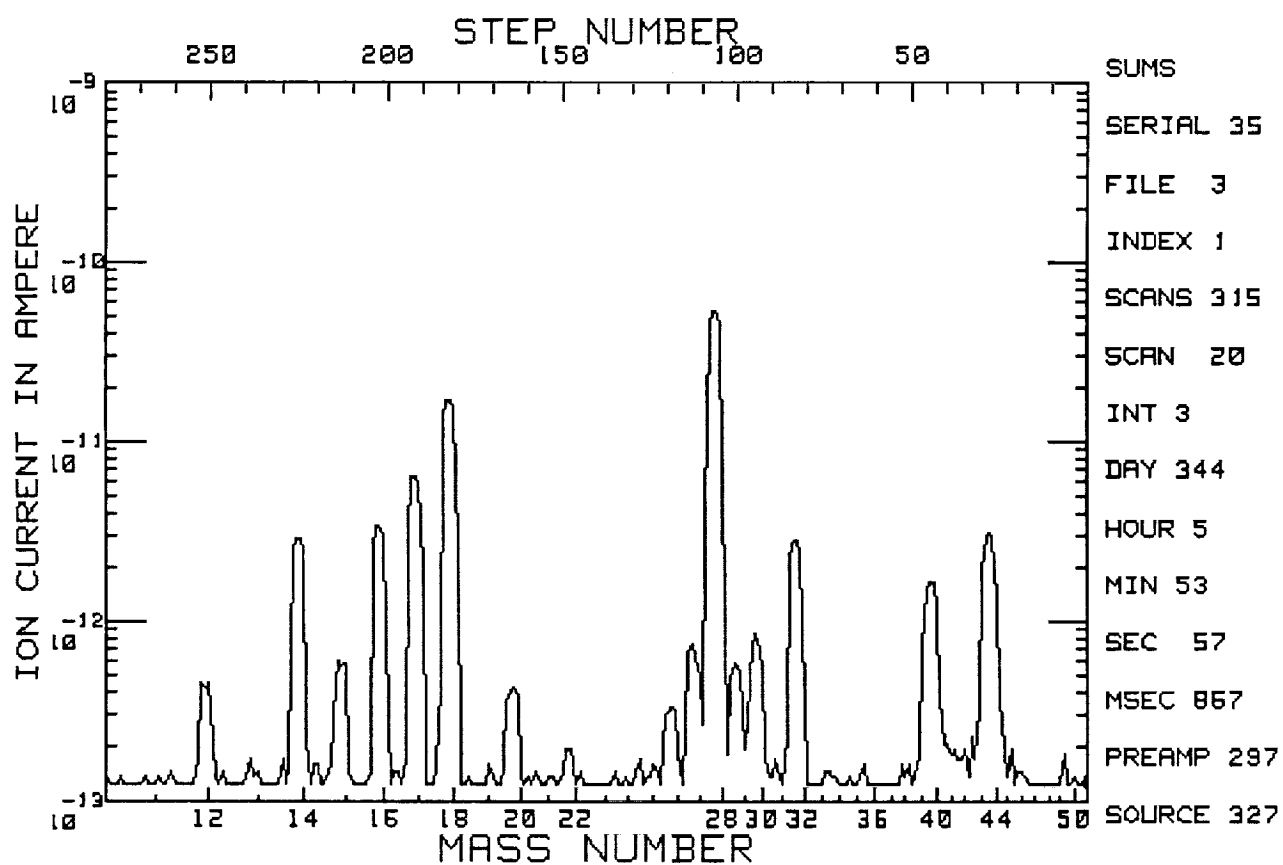
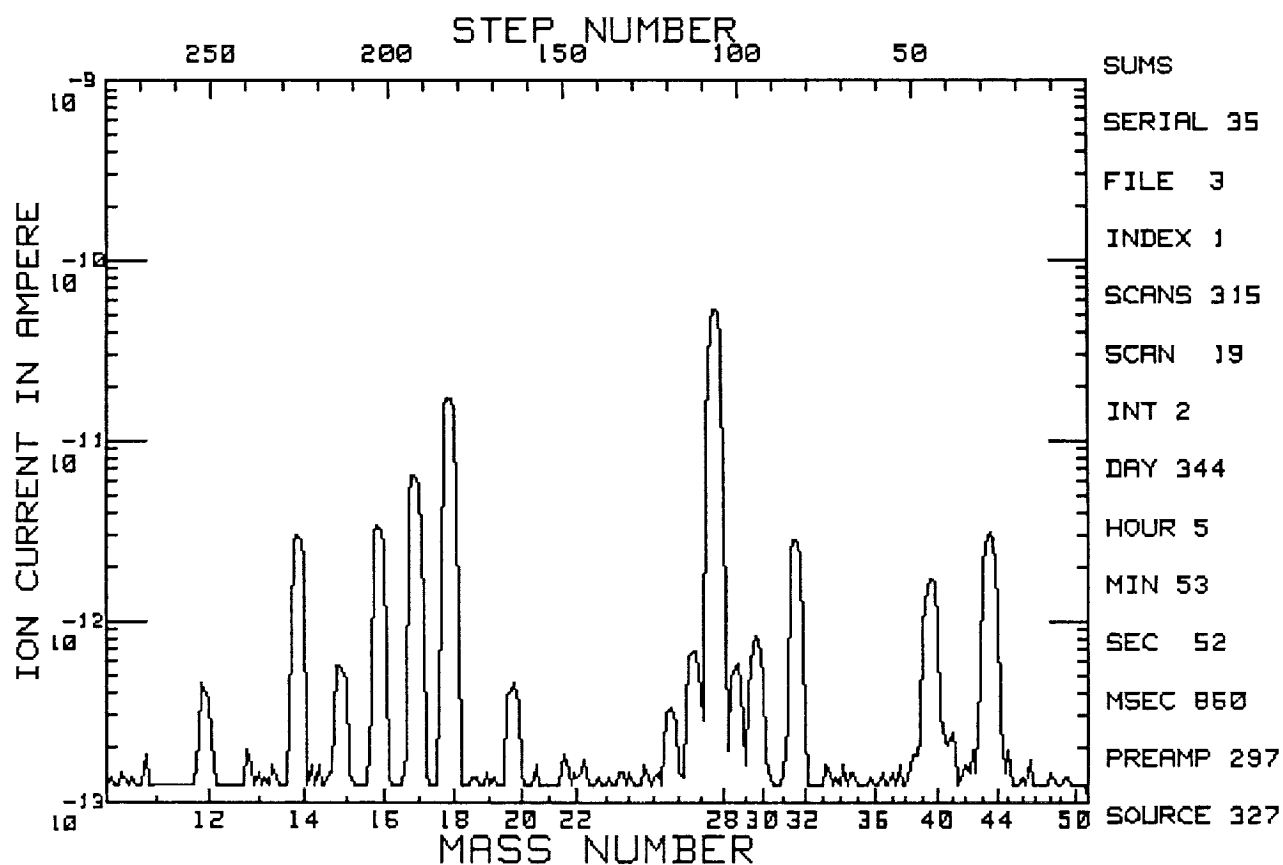


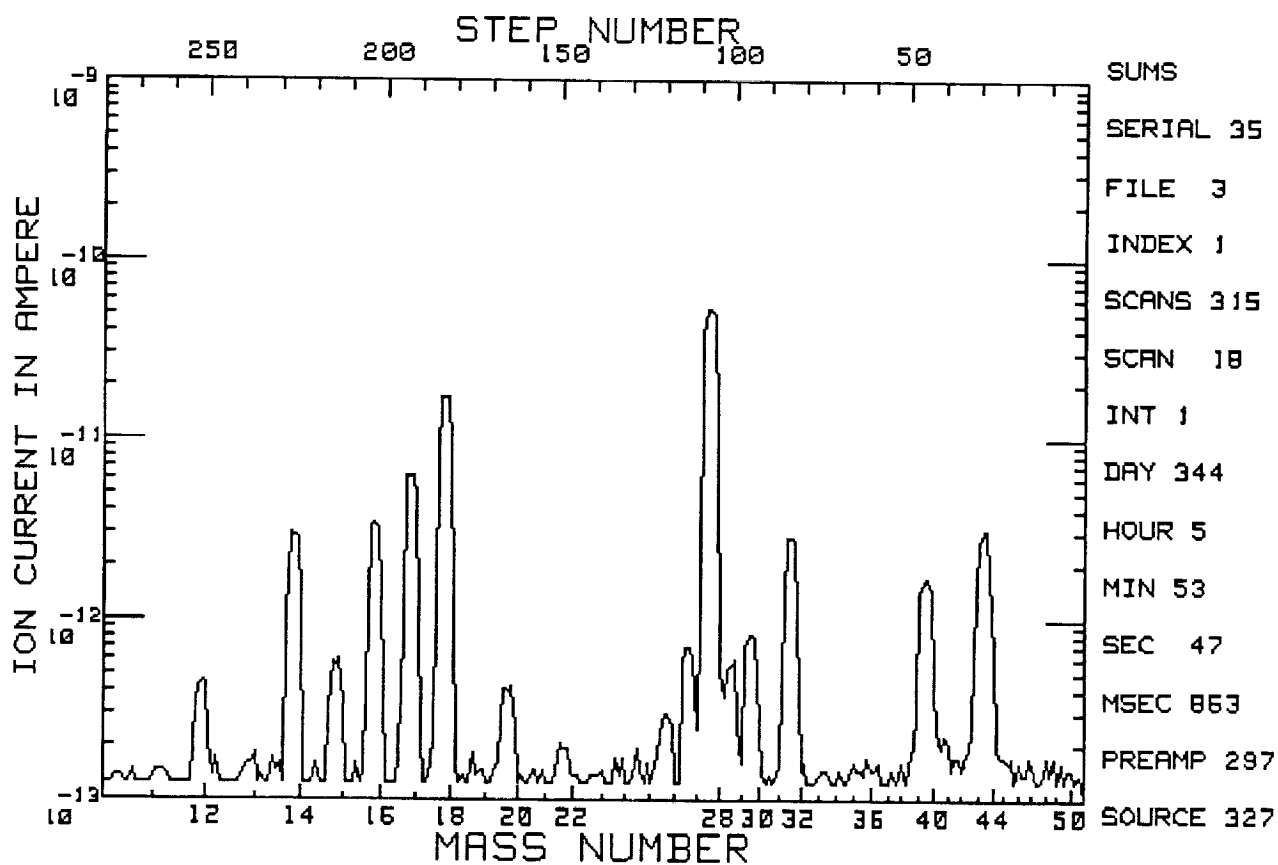
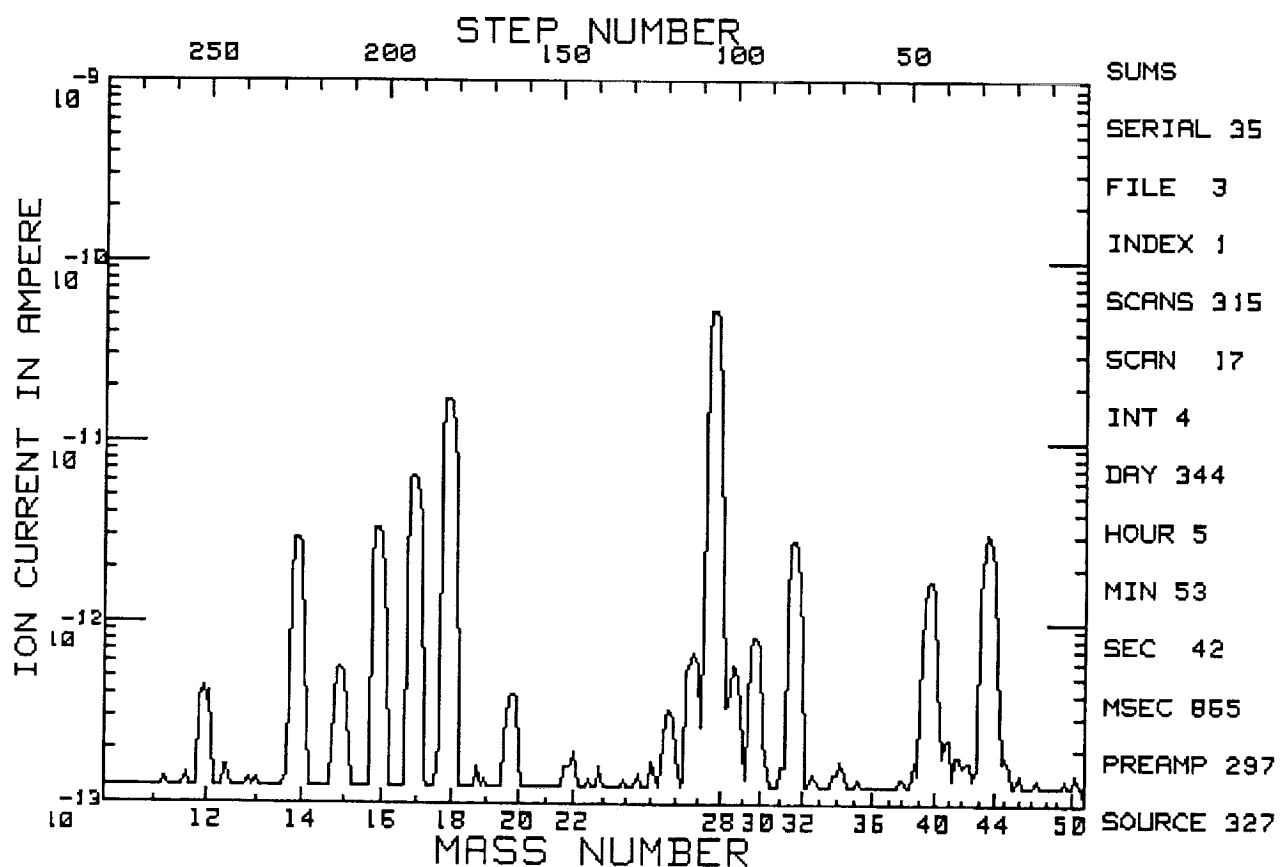


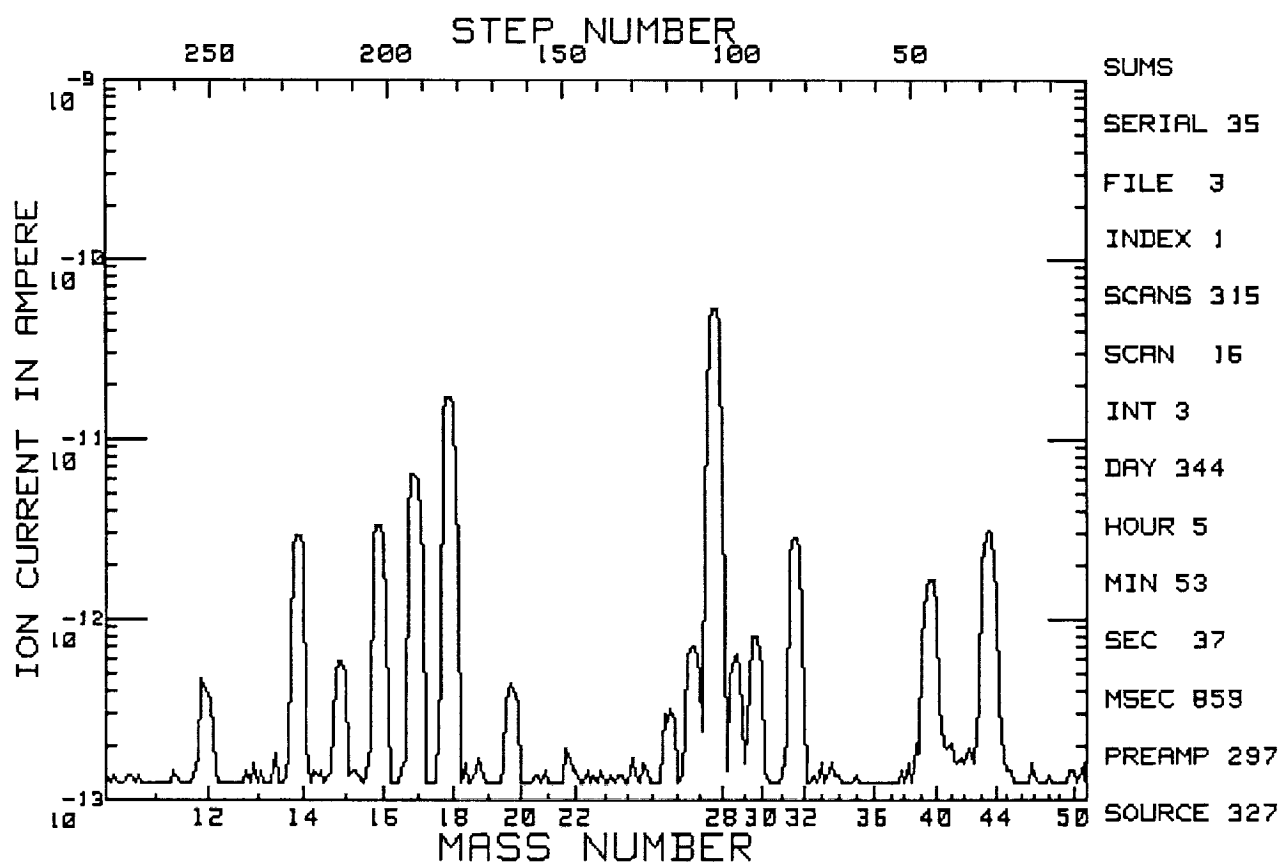
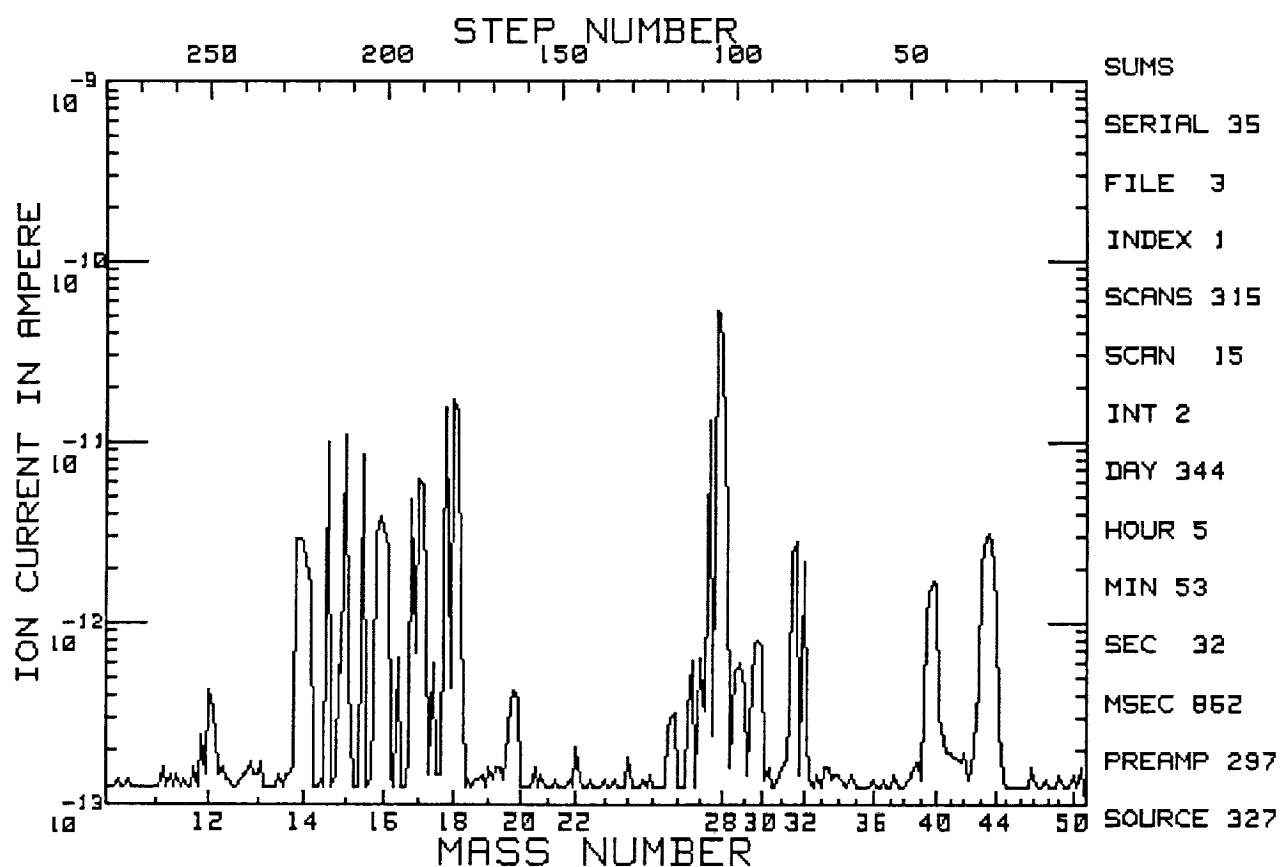


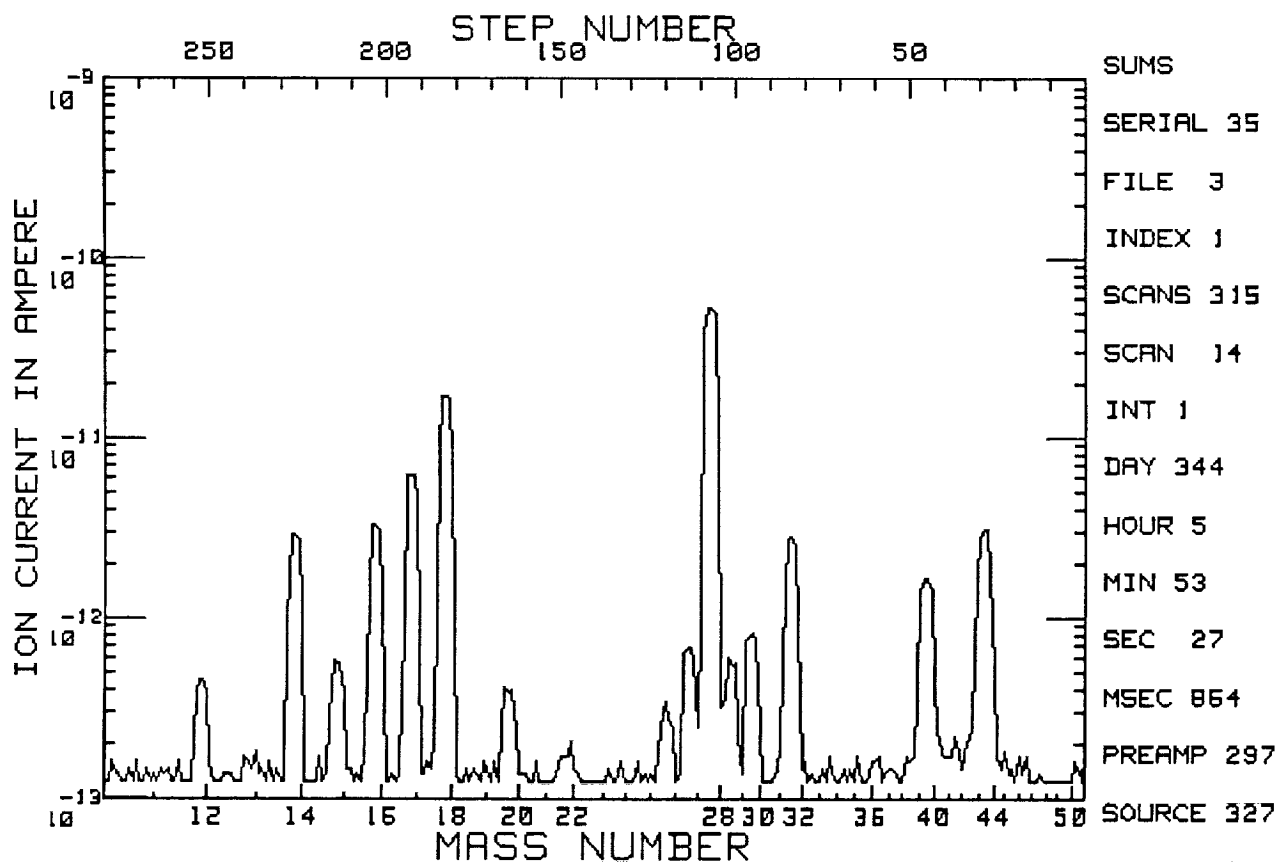
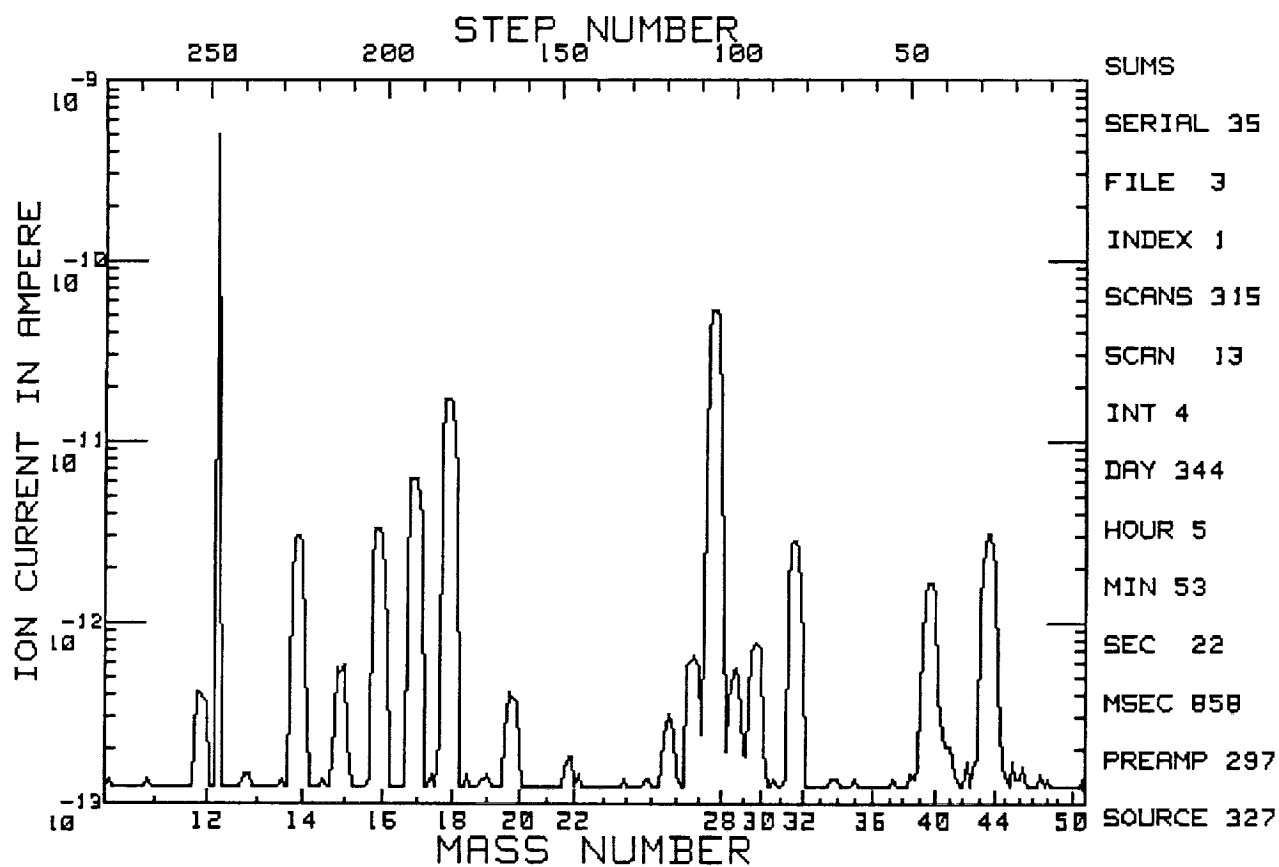


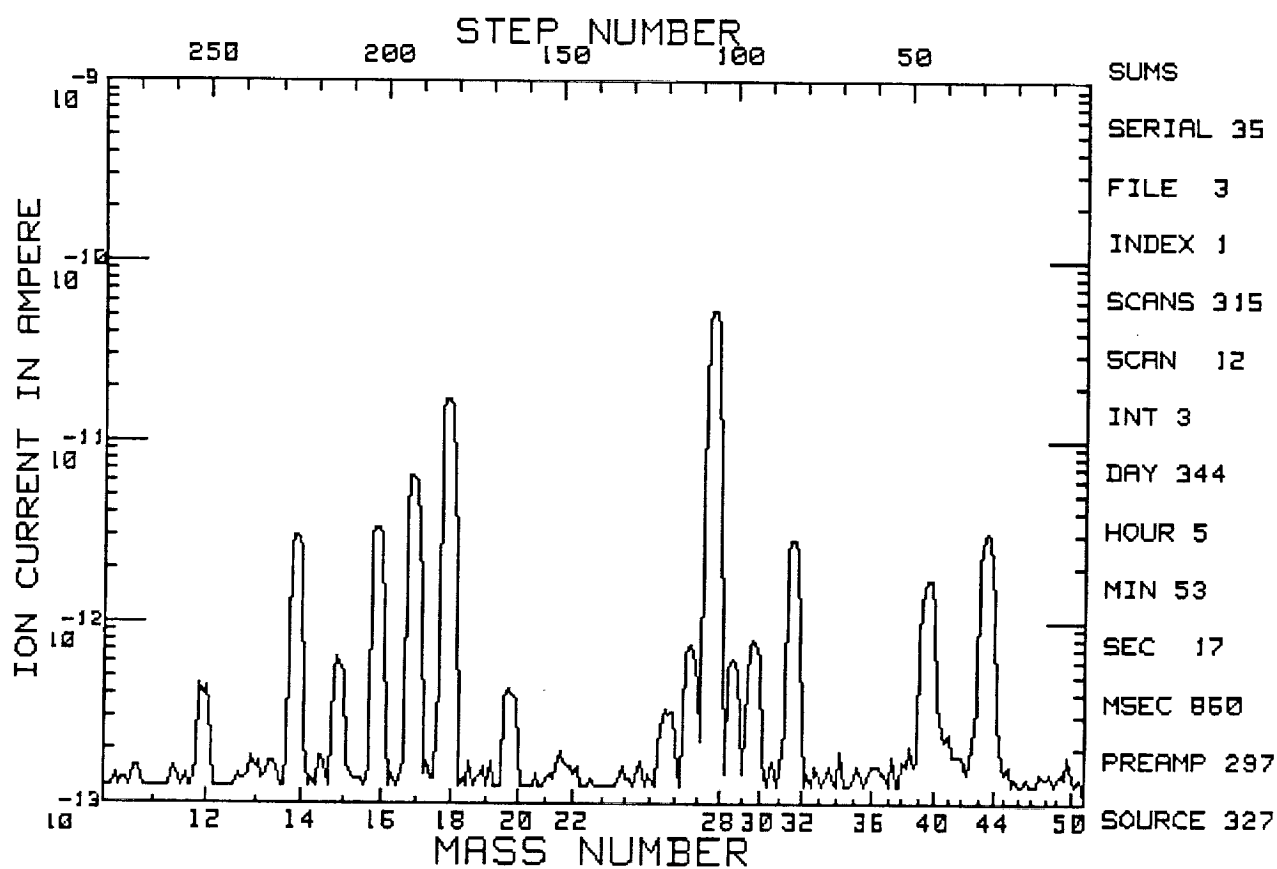
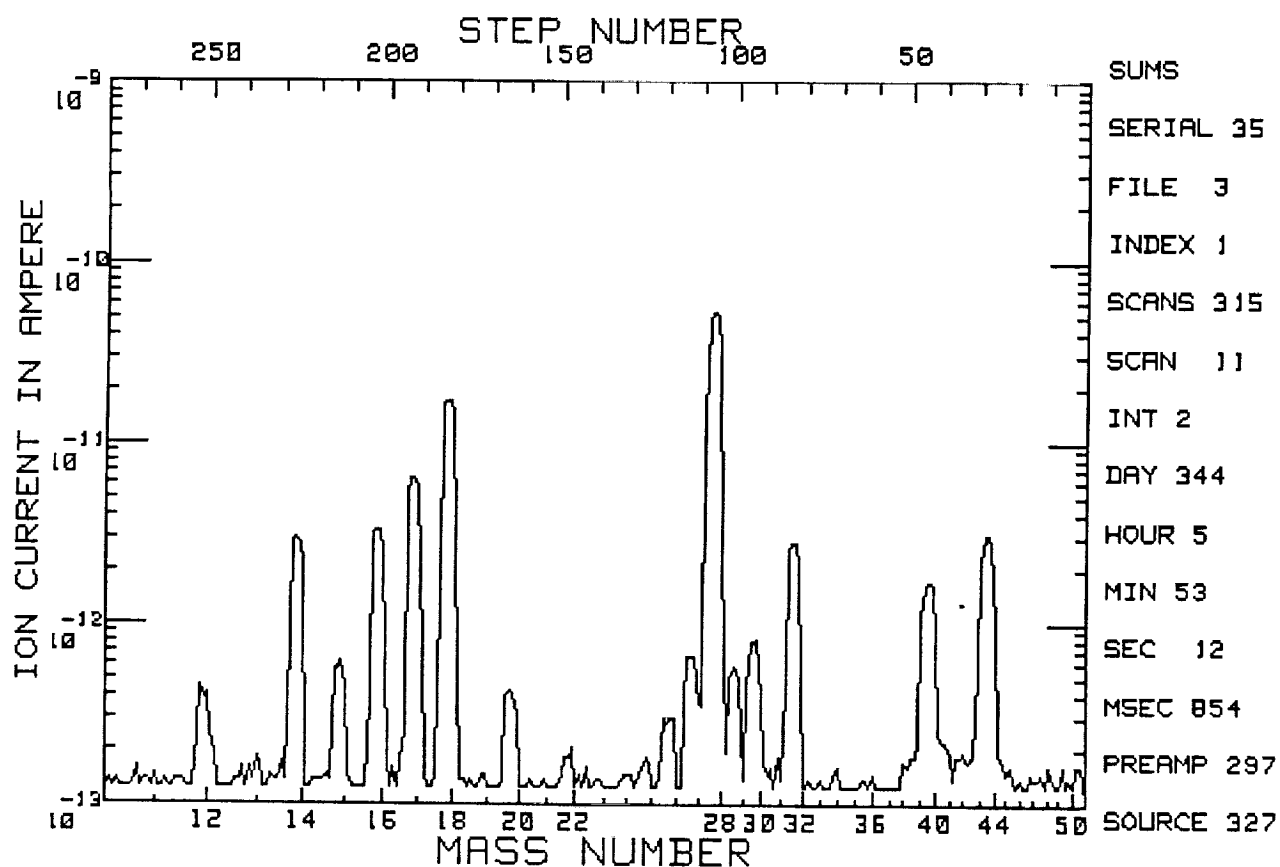


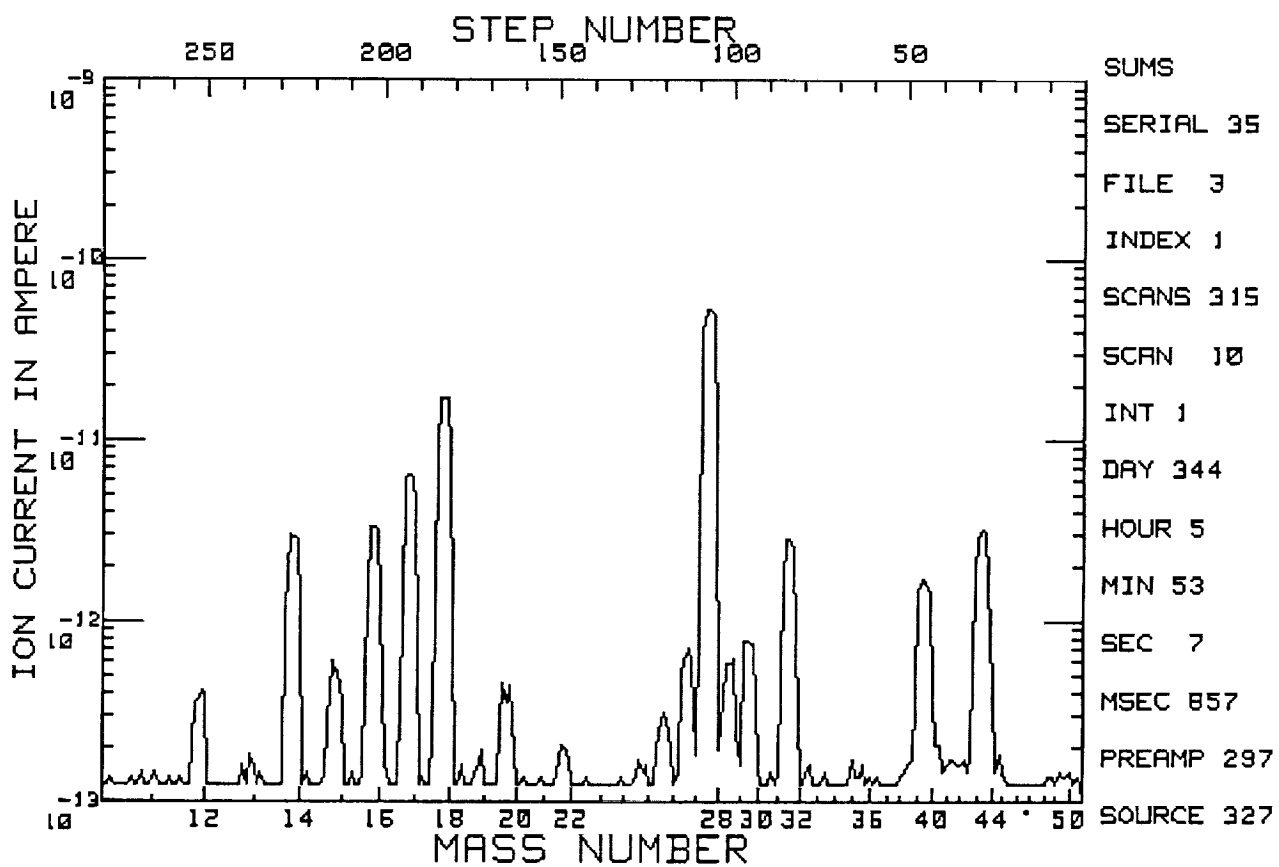
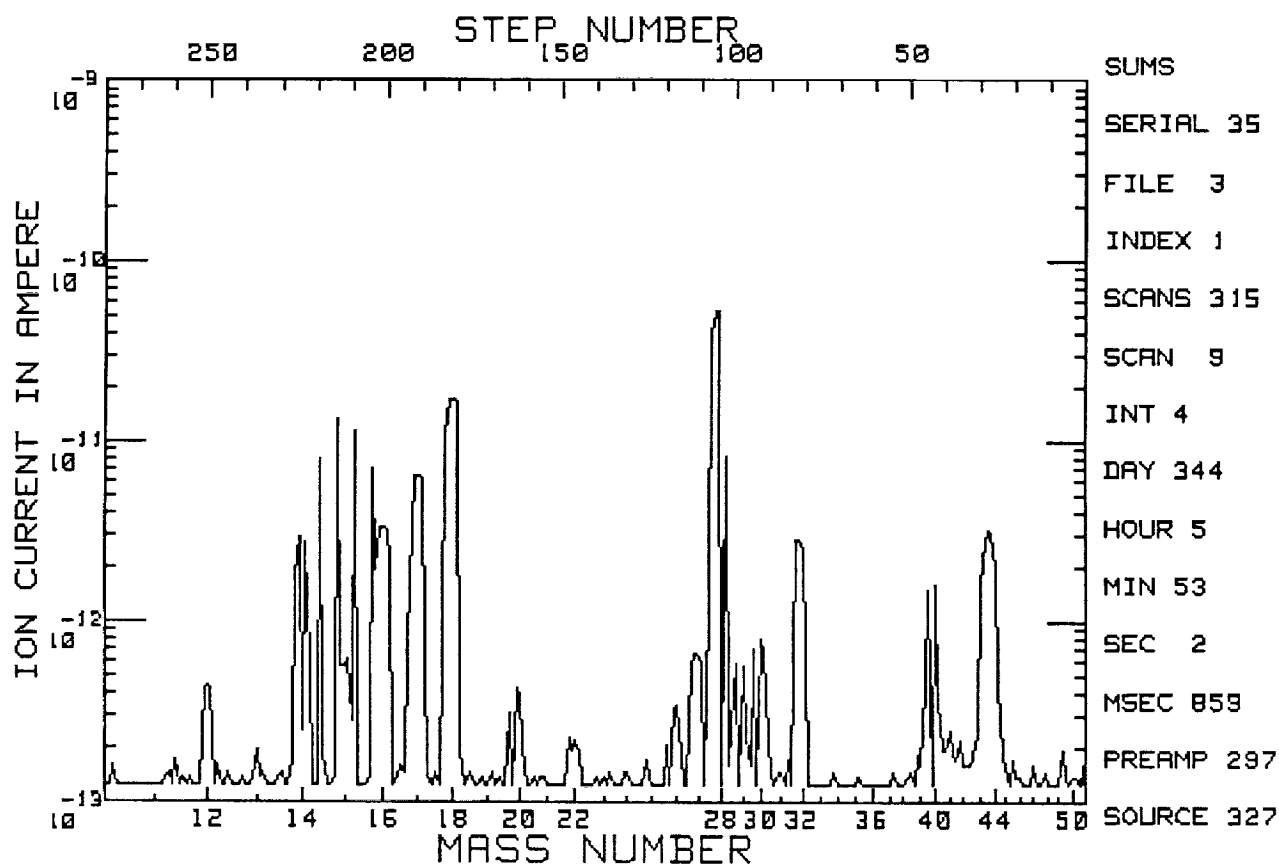


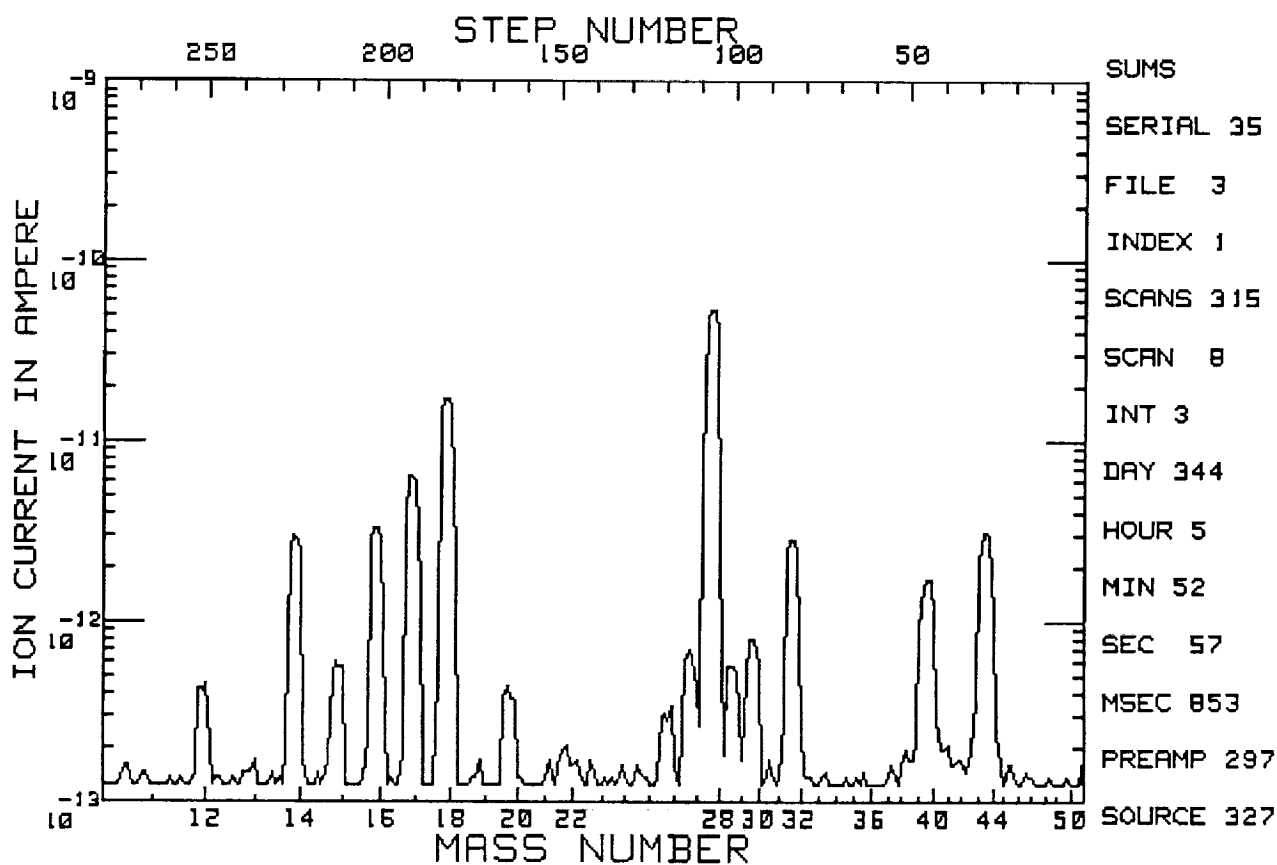
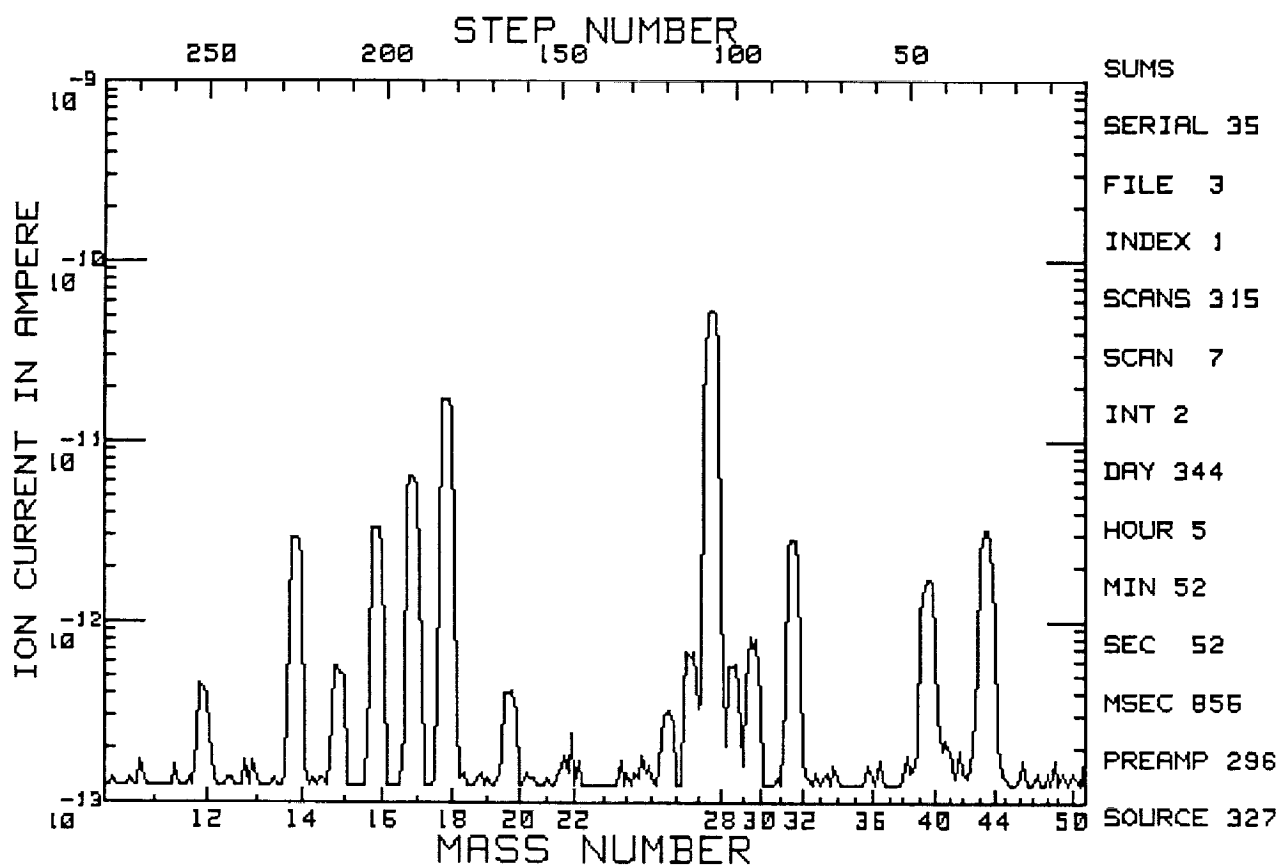


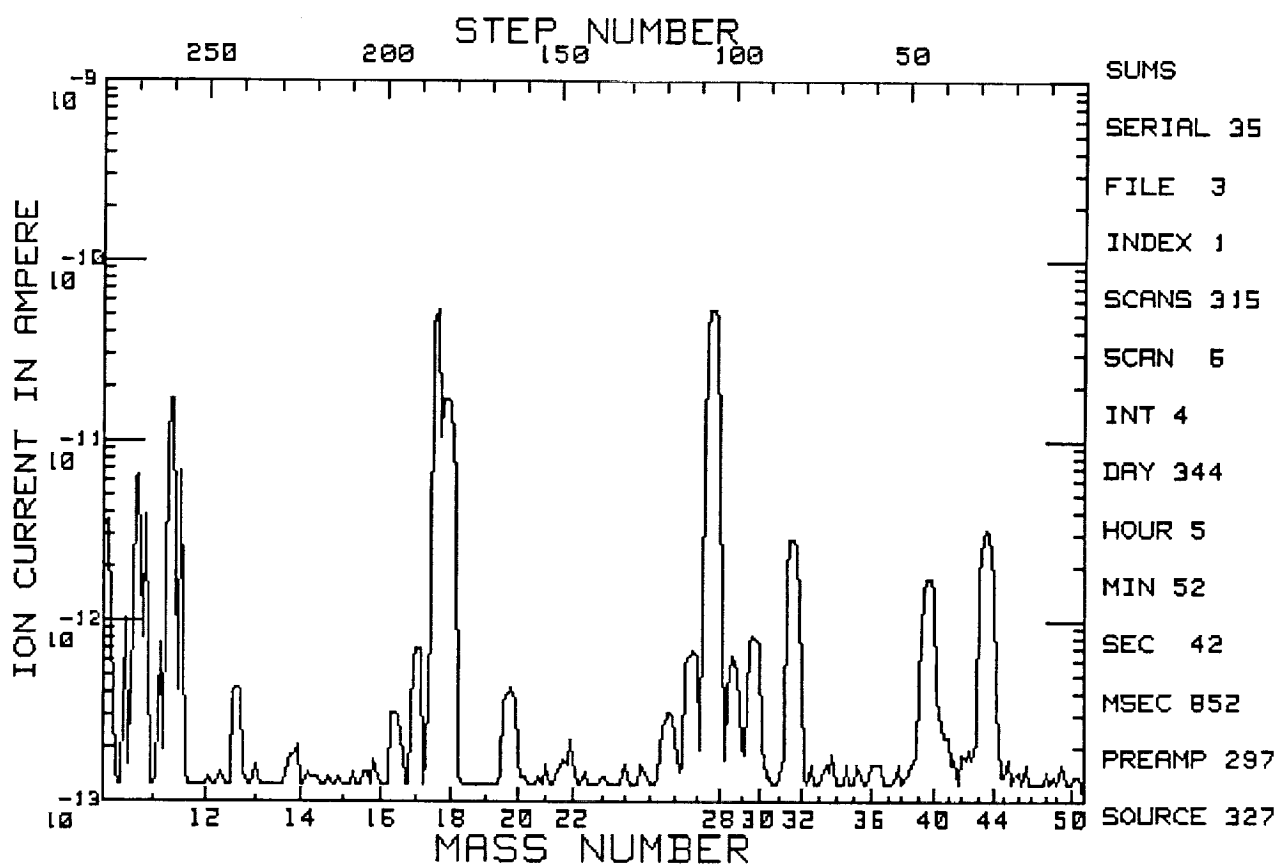
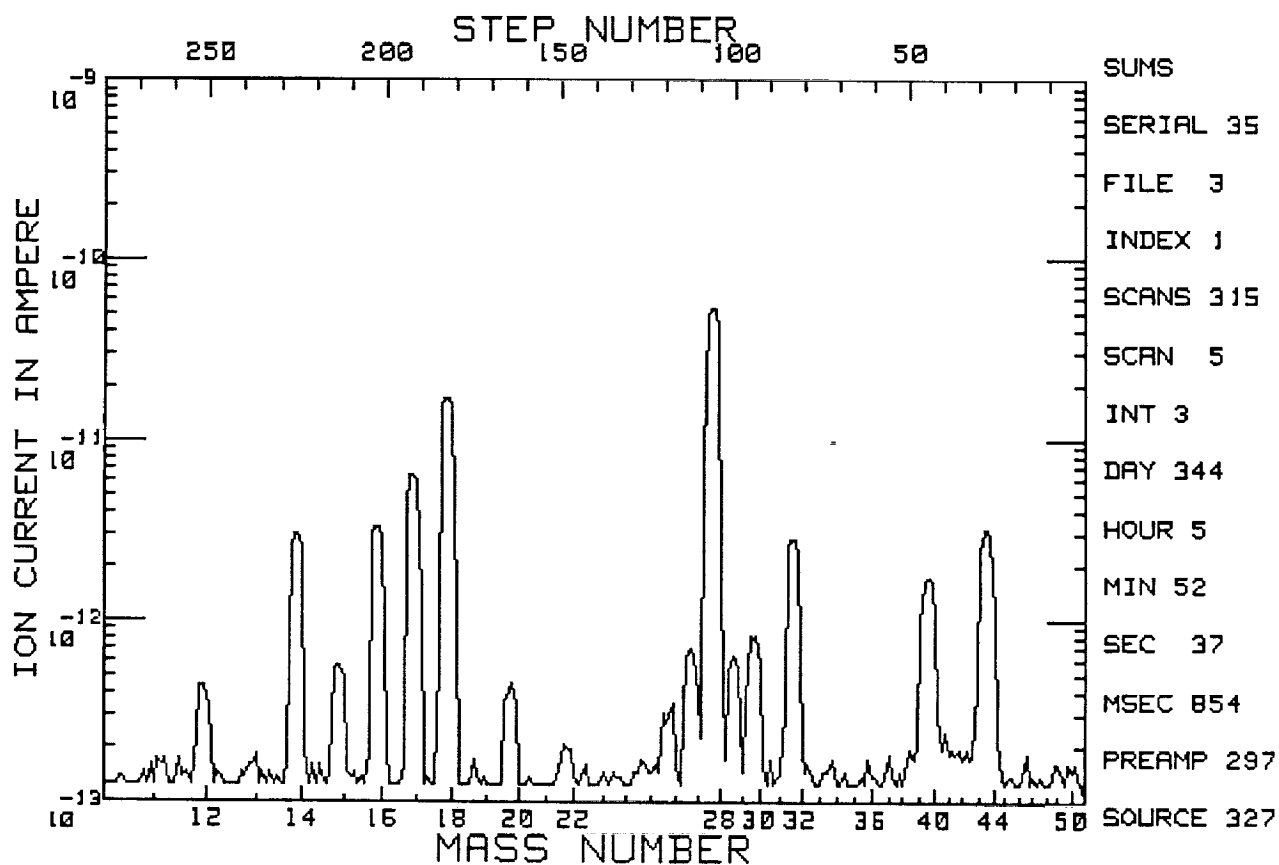


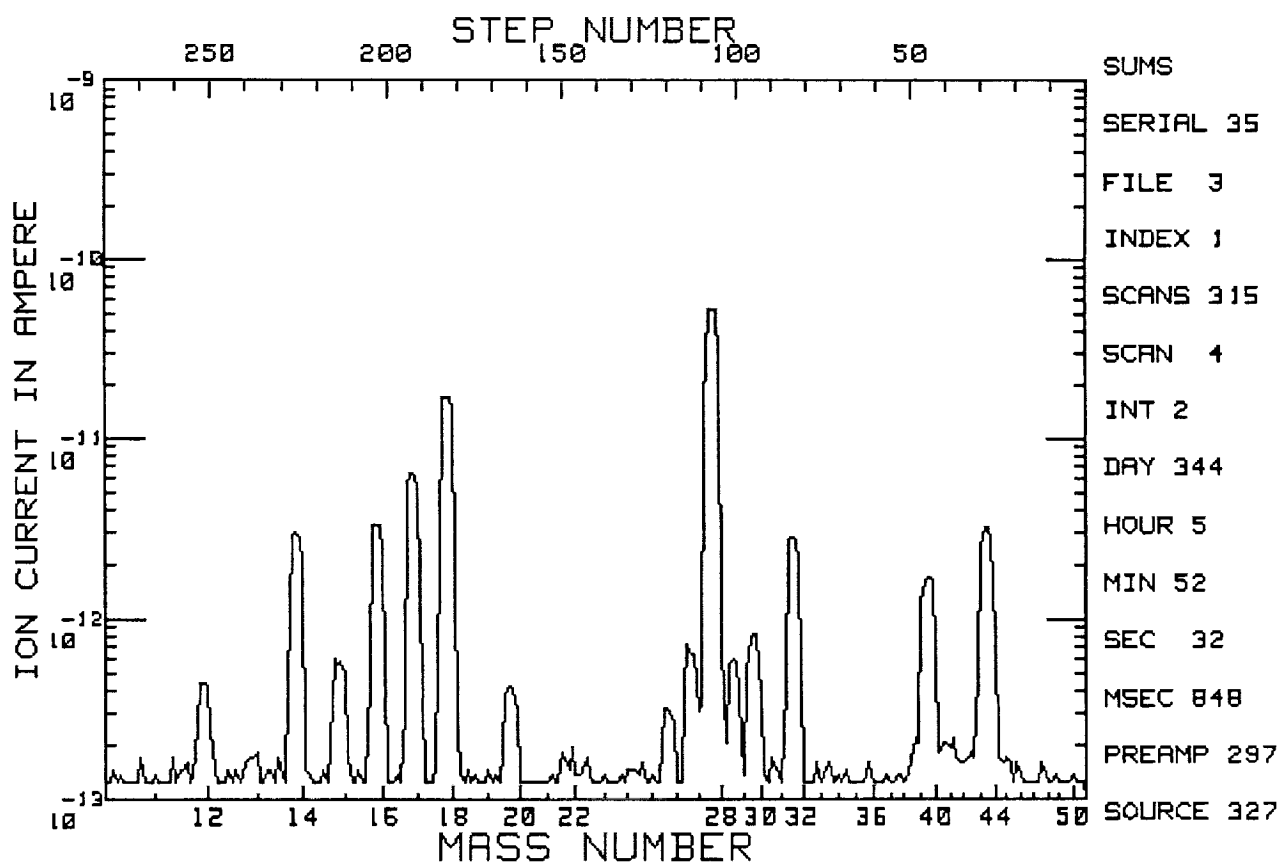
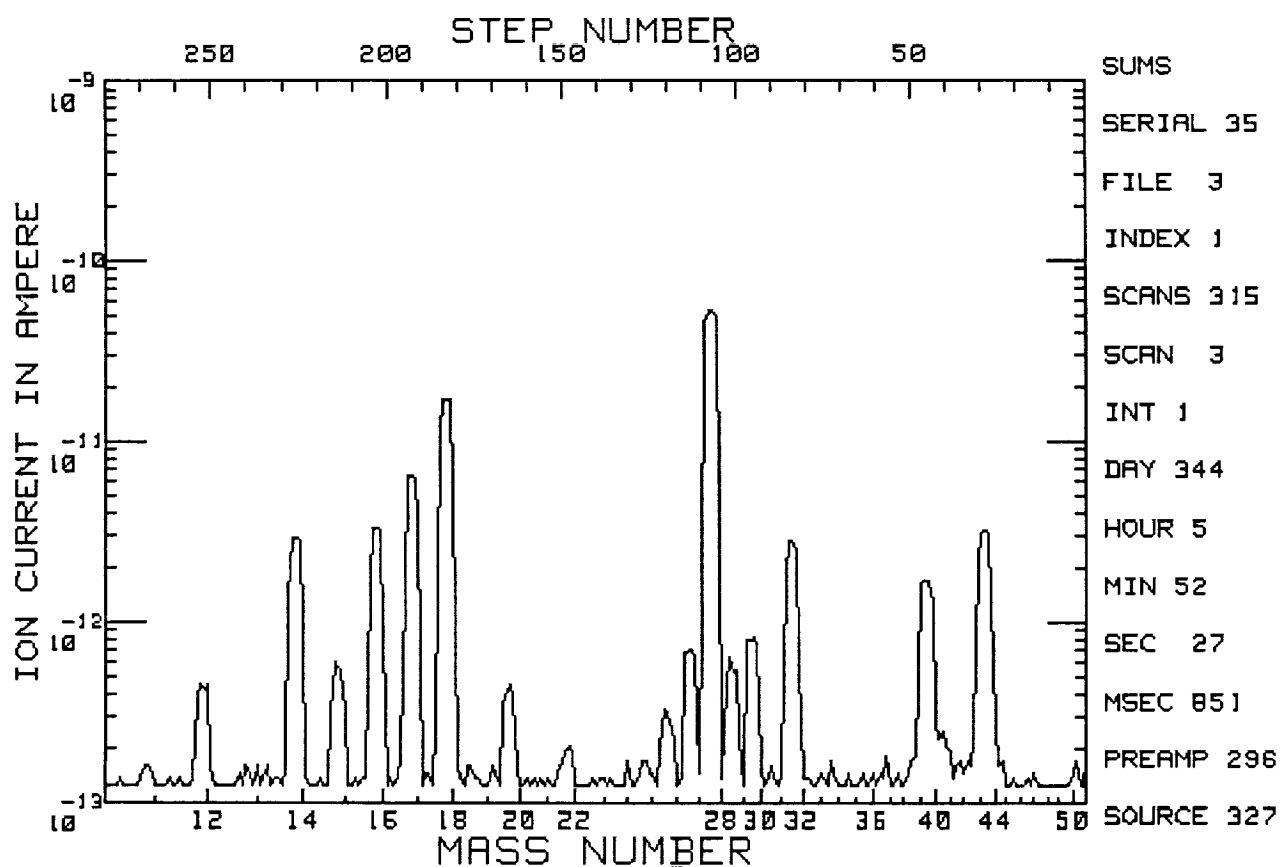


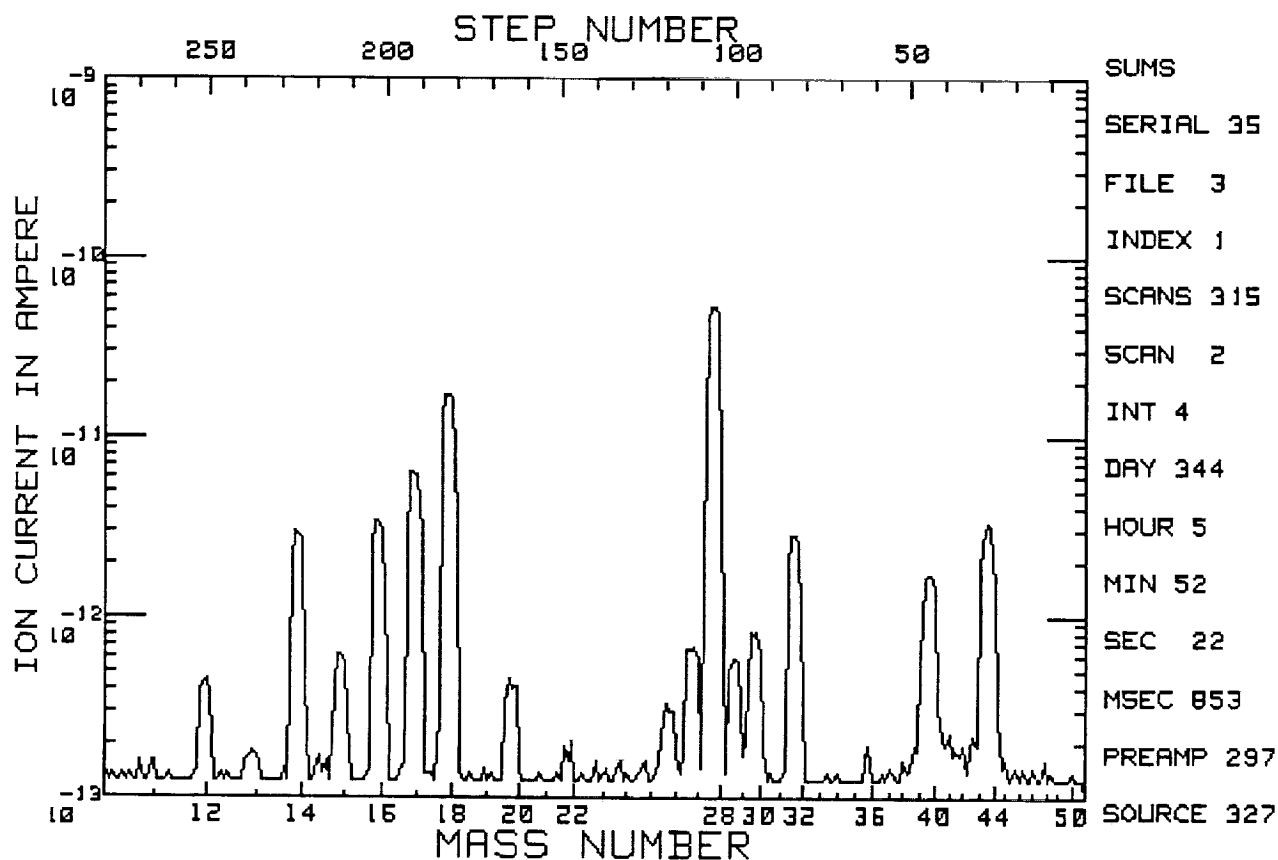
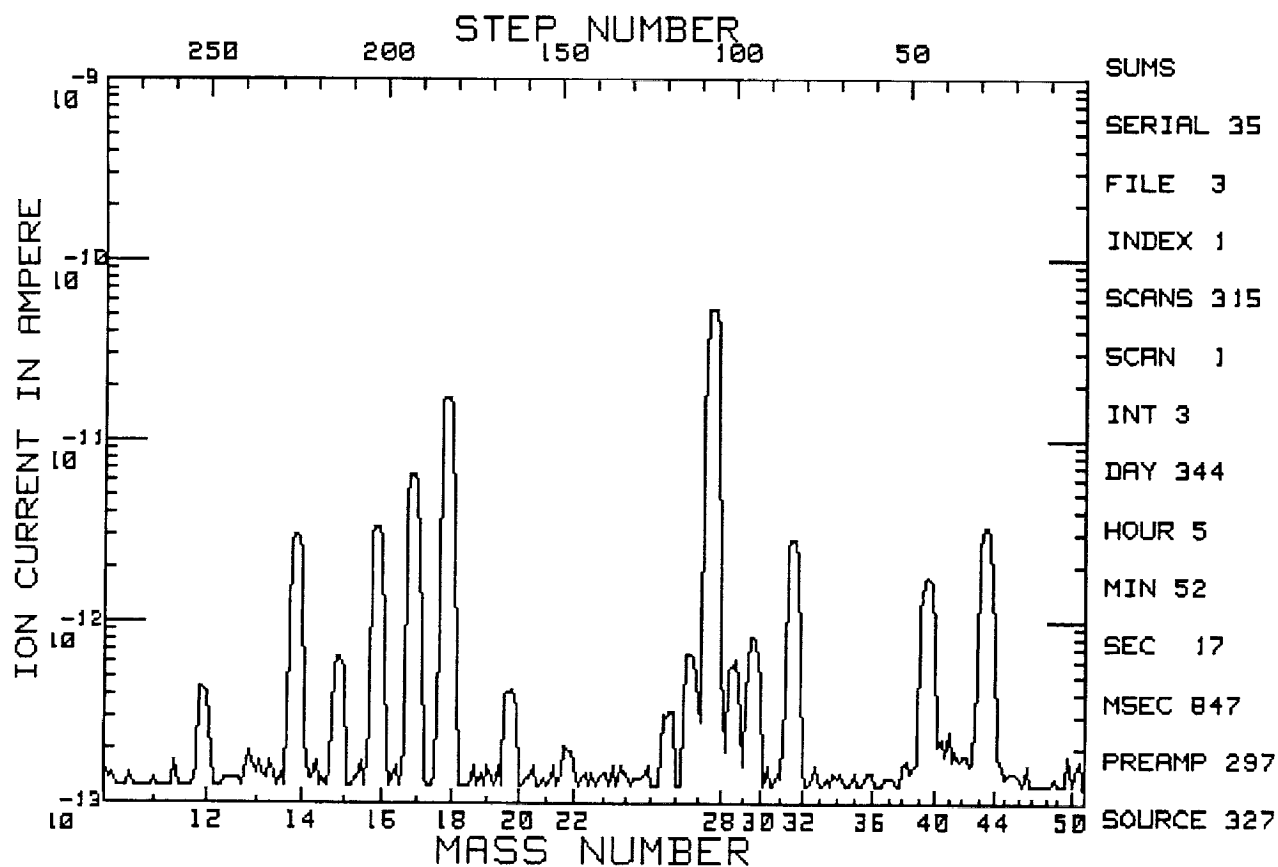












1.0 On Orbit Data

1.2 Printout of Peaks, Orbit

DATA FROM PK35ORB

TIME	44	40	32	30	28
21417.898	2.98E-12	1.64E-12	2.70E-12	8.22E-13	5.16E-11
21422.896	2.98E-12	1.63E-12	2.67E-12	7.83E-13	5.16E-11
21427.893	3.01E-12	1.64E-12	2.70E-12	7.67E-13	5.11E-11
21432.900	2.91E-12	1.64E-12	2.76E-12	8.14E-13	5.21E-11
21437.897	2.98E-12	1.67E-12	2.73E-12	7.90E-13	5.16E-11
21442.895	2.94E-12	1.63E-12	2.70E-12	7.90E-13	5.16E-11
21447.901	2.98E-12	1.61E-12	2.70E-12	7.44E-13	5.16E-11
21452.898	2.94E-12	1.66E-12	2.73E-12	7.83E-13	5.16E-11
21457.905	2.98E-12	1.64E-12	2.73E-12	7.90E-13	5.16E-11
21462.902	2.91E-12	1.63E-12	2.70E-12	7.90E-13	5.11E-11
21467.899	2.98E-12	1.60E-12	2.70E-12	7.59E-13	5.11E-11
21472.906	2.94E-12	1.64E-12	2.70E-12	7.90E-13	5.16E-11
21477.903	2.98E-12	1.64E-12	2.73E-12	8.14E-13	5.16E-11
21482.901	2.94E-12	1.60E-12	2.70E-12	8.29E-13	5.11E-11
21487.907	2.98E-12	1.63E-12	2.70E-12	7.59E-13	5.16E-11
21492.904	2.94E-12	1.69E-12	2.73E-12	7.83E-13	5.16E-11
21497.911	2.94E-12	1.64E-12	2.67E-12	7.52E-13	5.11E-11
21502.908	2.94E-12	1.61E-12	2.70E-12	7.75E-13	5.16E-11
21507.906	2.98E-12	1.58E-12	2.70E-12	7.90E-13	5.11E-11
21512.912	2.94E-12	1.64E-12	2.73E-12	7.59E-13	5.16E-11
21517.909	2.91E-12	1.63E-12	2.70E-12	7.83E-13	5.11E-11
21522.907	2.94E-12	1.64E-12	2.73E-12	7.98E-13	5.16E-11
21527.913	2.91E-12	1.63E-12	2.67E-12	7.75E-13	5.11E-11
21532.910	2.91E-12	1.63E-12	2.67E-12	7.83E-13	5.16E-11
21537.917	2.91E-12	1.61E-12	2.67E-12	7.59E-13	5.11E-11
21542.914	2.94E-12	1.66E-12	2.70E-12	7.90E-13	5.16E-11
21547.912	3.01E-12	1.61E-12	2.73E-12	7.67E-13	5.16E-11
21552.918	2.91E-12	1.64E-12	2.70E-12	7.59E-13	5.16E-11
21557.915	2.94E-12	1.63E-12	2.67E-12	7.44E-13	5.11E-11
21562.922	2.91E-12	1.67E-12	2.73E-12	7.75E-13	5.11E-11
21567.919	2.94E-12	1.64E-12	2.73E-12	7.44E-13	5.16E-11
21572.917	2.88E-12	1.63E-12	2.70E-12	7.75E-13	5.16E-11
21577.923	2.98E-12	1.60E-12	2.67E-12	8.22E-13	5.11E-11
21582.920	2.98E-12	1.61E-12	2.70E-12	7.36E-13	5.16E-11
21587.918	2.94E-12	1.61E-12	2.70E-12	7.59E-13	5.11E-11
21592.924	2.91E-12	1.61E-12	2.67E-12	7.59E-13	5.16E-11
21597.922	2.94E-12	1.61E-12	2.67E-12	7.67E-13	5.11E-11
21602.928	2.94E-12	1.66E-12	2.70E-12	7.75E-13	5.11E-11
21607.925	2.94E-12	1.63E-12	2.73E-12	7.75E-13	5.11E-11
21612.923	2.91E-12	1.61E-12	2.70E-12	7.75E-13	5.16E-11
21617.929	2.91E-12	1.61E-12	2.67E-12	7.98E-13	5.11E-11
21622.926	2.94E-12	1.64E-12	2.73E-12	7.75E-13	5.11E-11
21627.924	2.88E-12	1.58E-12	2.73E-12	7.52E-13	5.16E-11
21632.930	2.88E-12	1.64E-12	2.70E-12	7.59E-13	5.16E-11
21637.928	2.88E-12	1.64E-12	2.67E-12	8.06E-13	5.11E-11
21642.934	2.88E-12	1.63E-12	2.64E-12	7.90E-13	5.11E-11
21647.931	2.91E-12	1.60E-12	2.64E-12	7.90E-13	5.11E-11
21652.929	2.88E-12	1.66E-12	2.70E-12	7.90E-13	5.16E-11
21657.935	2.94E-12	1.61E-12	2.67E-12	7.44E-13	5.11E-11
21662.933	2.88E-12	1.63E-12	2.67E-12	7.90E-13	5.16E-11
21667.939	2.88E-12	1.61E-12	2.73E-12	7.98E-13	5.11E-11
21672.936	2.91E-12	1.63E-12	2.73E-12	7.83E-13	5.16E-11
21677.934	2.91E-12	1.63E-12	2.67E-12	7.75E-13	5.11E-11
21682.940	2.85E-12	1.58E-12	2.67E-12	7.59E-13	5.16E-11
21687.938	2.88E-12	1.63E-12	2.70E-12	7.98E-13	5.11E-11

DATA FROM PK35ORB

TIME	44	40	32	30	28
21692.935	2.88E-12	1.64E-12	2.64E-12	7.59E-13	5.16E-11
21697.941	2.91E-12	1.55E-12	2.64E-12	7.44E-13	5.11E-11
21702.939	2.85E-12	1.61E-12	2.64E-12	7.98E-13	5.11E-11
21707.945	2.88E-12	1.61E-12	2.67E-12	7.44E-13	5.11E-11
21712.942	2.91E-12	1.61E-12	2.70E-12	8.06E-13	5.16E-11
21717.940	2.91E-12	1.61E-12	2.67E-12	7.75E-13	5.11E-11
21722.946	2.88E-12	1.66E-12	2.67E-12	7.75E-13	5.16E-11
21727.944	2.88E-12	1.60E-12	2.70E-12	7.75E-13	5.16E-11
21732.941	2.94E-12	1.67E-12	2.70E-12	7.98E-13	5.11E-11
21737.947	2.94E-12	1.64E-12	2.67E-12	8.06E-13	5.11E-11
21742.945	2.91E-12	1.64E-12	2.67E-12	7.75E-13	5.16E-11
21747.951	2.85E-12	1.58E-12	2.70E-12	7.36E-13	5.16E-11
21752.949	2.94E-12	1.64E-12	2.67E-12	7.75E-13	5.16E-11
21757.946	2.91E-12	1.61E-12	2.67E-12	8.06E-13	5.11E-11
21762.952	2.85E-12	1.63E-12	2.67E-12	7.75E-13	5.16E-11
21767.950	2.85E-12	1.64E-12	2.73E-12	7.59E-13	5.16E-11
21772.956	2.91E-12	1.66E-12	2.70E-12	8.06E-13	5.16E-11
21777.954	2.91E-12	1.61E-12	2.64E-12	7.52E-13	5.11E-11
21782.951	2.88E-12	1.67E-12	2.73E-12	7.75E-13	5.16E-11
21787.957	2.88E-12	1.63E-12	2.70E-12	8.06E-13	5.16E-11
21792.955	2.94E-12	1.66E-12	2.70E-12	7.67E-13	5.16E-11
21797.952	2.94E-12	1.64E-12	2.67E-12	7.98E-13	5.16E-11
21802.958	2.88E-12	1.63E-12	2.70E-12	7.98E-13	5.16E-11
21807.956	2.88E-12	1.61E-12	2.67E-12	7.44E-13	5.16E-11
21812.962	2.91E-12	1.64E-12	2.67E-12	7.98E-13	5.16E-11
21817.960	2.88E-12	1.61E-12	2.67E-12	7.83E-13	5.11E-11
21822.957	2.88E-12	1.66E-12	2.67E-12	7.98E-13	5.16E-11
21827.963	2.85E-12	1.66E-12	2.70E-12	7.83E-13	5.21E-11
21832.961	2.94E-12	1.64E-12	2.67E-12	8.06E-13	5.21E-11
21837.958	2.91E-12	1.61E-12	2.64E-12	7.52E-13	5.16E-11
21842.965	2.85E-12	1.66E-12	2.70E-12	7.75E-13	5.16E-11
21847.962	2.88E-12	1.63E-12	2.67E-12	7.90E-13	5.21E-11
21852.968	2.91E-12	1.60E-12	2.67E-12	7.98E-13	5.21E-11
21857.966	2.91E-12	1.66E-12	2.70E-12	7.90E-13	5.16E-11
21862.963	2.85E-12	1.64E-12	2.70E-12	7.52E-13	5.16E-11
21867.970	2.85E-12	1.67E-12	2.73E-12	7.59E-13	5.21E-11
21872.967	2.88E-12	1.61E-12	2.64E-12	7.44E-13	5.21E-11
21877.964	2.85E-12	1.64E-12	2.70E-12	7.59E-13	5.16E-11
21882.971	2.85E-12	1.60E-12	2.70E-12	7.90E-13	5.16E-11
21887.968	2.88E-12	1.63E-12	2.73E-12	7.67E-13	5.16E-11
21892.975	2.91E-12	1.61E-12	2.67E-12	7.90E-13	5.21E-11
21897.972	2.88E-12	1.50E-12	2.70E-12	7.52E-13	5.16E-11
21902.969	2.85E-12	1.63E-12	2.73E-12	7.98E-13	5.16E-11
21907.976	2.88E-12	1.64E-12	2.76E-12	8.06E-13	5.16E-11
21912.973	2.91E-12	1.64E-12	2.73E-12	7.83E-13	5.16E-11
21917.979	2.85E-12	1.63E-12	2.70E-12	7.67E-13	5.16E-11
21922.977	2.85E-12	1.63E-12	2.67E-12	7.75E-13	5.16E-11
21927.974	2.91E-12	1.67E-12	2.73E-12	7.83E-13	5.21E-11
21932.981	2.88E-12	1.67E-12	2.67E-12	8.06E-13	5.16E-11
21937.978	2.91E-12	1.63E-12	2.67E-12	7.98E-13	5.16E-11
21942.976	2.82E-12	1.64E-12	2.73E-12	7.52E-13	5.16E-11
21947.982	2.85E-12	1.63E-12	2.73E-12	8.06E-13	4.81E-11
21952.979	2.85E-12	1.61E-12	2.67E-12	7.90E-13	5.16E-11
21957.986	2.85E-12	1.63E-12	2.67E-12	7.67E-13	5.16E-11
21962.983	2.82E-12	1.67E-12	2.64E-12	7.36E-13	5.16E-11

DATA FROM PK35ORB

TIME	44	40	32	30	28
21967.980	2.82E-12	1.64E-12	2.70E-12	7.75E-13	5.16E-11
21972.987	2.85E-12	1.63E-12	2.64E-12	8.06E-13	5.21E-11
21977.984	2.82E-12	1.58E-12	2.67E-12	7.28E-13	5.16E-11
21982.982	2.85E-12	1.64E-12	2.70E-12	7.98E-13	5.16E-11
21987.988	2.85E-12	1.60E-12	2.70E-12	7.44E-13	5.21E-11
21992.985	2.85E-12	1.60E-12	2.67E-12	7.44E-13	5.16E-11
21997.992	2.91E-12	1.64E-12	2.64E-12	7.75E-13	5.16E-11
22002.989	2.79E-12	1.63E-12	2.70E-12	7.90E-13	5.16E-11
22007.987	2.85E-12	1.63E-12	2.67E-12	7.83E-13	5.16E-11
22012.993	2.82E-12	1.64E-12	2.67E-12	7.83E-13	5.16E-11
22017.990	2.82E-12	1.60E-12	2.73E-12	7.98E-13	5.11E-11
22022.997	2.82E-12	1.64E-12	2.70E-12	7.52E-13	5.16E-11
22027.994	2.82E-12	1.61E-12	2.70E-12	7.83E-13	5.16E-11
22032.992	2.82E-12	1.61E-12	2.64E-12	7.75E-13	5.21E-11
22037.998	2.82E-12	1.61E-12	2.64E-12	7.59E-13	5.16E-11
22042.995	2.82E-12	1.66E-12	2.70E-12	7.90E-13	5.16E-11
22047.993	2.85E-12	1.63E-12	2.70E-12	7.67E-13	5.16E-11
22052.999	2.85E-12	1.64E-12	2.70E-12	8.14E-13	5.16E-11
22057.997	2.88E-12	1.64E-12	2.70E-12	7.98E-13	5.16E-11
22063.003	2.85E-12	1.63E-12	2.73E-12	7.52E-13	5.16E-11
22068.000	2.85E-12	1.64E-12	2.73E-12	7.90E-13	5.16E-11
22072.998	2.88E-12	1.60E-12	2.67E-12	7.59E-13	5.16E-11
22078.004	2.88E-12	1.67E-12	2.67E-12	8.06E-13	5.16E-11
22083.001	2.85E-12	1.61E-12	2.73E-12	7.90E-13	5.16E-11
22087.999	2.98E-12	1.67E-12	2.67E-12	8.06E-13	5.16E-11
22093.005	2.85E-12	1.67E-12	2.73E-12	7.75E-13	5.16E-11
22098.003	2.91E-12	1.63E-12	2.70E-12	7.83E-13	5.16E-11
22103.009	2.82E-12	1.64E-12	2.70E-12	7.59E-13	5.16E-11
22108.006	2.88E-12	1.66E-12	2.73E-12	7.67E-13	5.16E-11
22113.004	2.88E-12	1.63E-12	2.70E-12	7.67E-13	5.16E-11
22118.010	2.88E-12	1.67E-12	2.64E-12	7.52E-13	5.21E-11
22123.008	2.91E-12	1.64E-12	2.70E-12	7.98E-13	5.16E-11
22128.014	2.91E-12	1.61E-12	2.67E-12	7.59E-13	5.16E-11
22133.011	2.88E-12	1.66E-12	2.73E-12	7.59E-13	5.16E-11
22138.009	2.98E-12	1.67E-12	2.70E-12	7.90E-13	5.16E-11
22143.015	2.88E-12	1.64E-12	2.70E-12	7.75E-13	5.16E-11
22148.013	2.98E-12	1.64E-12	2.76E-12	7.98E-13	5.16E-11
22153.010	2.88E-12	1.67E-12	2.70E-12	7.90E-13	5.21E-11
22158.016	2.98E-12	1.71E-12	2.76E-12	8.14E-13	5.21E-11
22163.014	2.94E-12	1.64E-12	2.70E-12	8.06E-13	5.16E-11
22168.020	2.98E-12	1.64E-12	2.70E-12	8.29E-13	5.16E-11
22173.018	2.91E-12	1.72E-12	2.76E-12	7.75E-13	5.21E-11
22178.015	2.91E-12	1.71E-12	2.70E-12	7.75E-13	5.26E-11
22183.021	2.98E-12	1.66E-12	2.70E-12	7.75E-13	5.21E-11
22188.019	2.98E-12	1.71E-12	2.76E-12	7.98E-13	5.21E-11
22193.016	2.91E-12	1.75E-12	2.76E-12	7.83E-13	5.21E-11
22198.023	2.98E-12	1.69E-12	2.76E-12	8.14E-13	5.26E-11
22203.020	3.01E-12	1.61E-12	2.73E-12	7.67E-13	5.21E-11
22208.026	2.98E-12	1.69E-12	2.76E-12	7.90E-13	5.26E-11
22213.024	2.98E-12	1.69E-12	2.76E-12	7.67E-13	5.21E-11
22218.021	2.94E-12	1.72E-12	2.79E-12	7.75E-13	5.26E-11
22223.028	3.04E-12	1.67E-12	2.73E-12	7.90E-13	5.26E-11
22228.025	3.04E-12	1.69E-12	2.76E-12	7.75E-13	5.26E-11
22233.022	3.04E-12	1.69E-12	2.79E-12	8.22E-13	5.21E-11
22238.029	2.98E-12	1.77E-12	2.76E-12	7.98E-13	5.26E-11

DATA FROM PK35ORB

TIME	44	40	32	30	28
22243.026	3.04E-12	1.74E-12	2.73E-12	7.83E-13	5.26E-11
22248.032	3.04E-12	1.75E-12	2.76E-12	8.06E-13	5.26E-11
22253.030	3.04E-12	1.72E-12	2.79E-12	8.06E-13	5.21E-11
22258.027	3.04E-12	1.71E-12	2.79E-12	8.45E-13	5.26E-11
22263.034	3.04E-12	1.74E-12	2.82E-12	7.98E-13	5.31E-11
22268.031	3.07E-12	1.78E-12	2.76E-12	7.67E-13	5.31E-11
22273.037	3.07E-12	1.74E-12	2.79E-12	8.14E-13	5.21E-11
22278.035	3.10E-12	1.71E-12	2.76E-12	8.22E-13	5.31E-11
22283.032	3.04E-12	1.72E-12	2.82E-12	7.67E-13	5.31E-11
22288.039	3.07E-12	1.74E-12	2.76E-12	8.06E-13	5.31E-11
22293.036	3.07E-12	1.75E-12	2.76E-12	7.98E-13	5.31E-11
22298.034	3.07E-12	1.75E-12	2.73E-12	7.98E-13	5.26E-11
22303.040	3.04E-12	1.74E-12	2.79E-12	7.98E-13	5.26E-11
22308.037	3.07E-12	1.75E-12	2.76E-12	7.75E-13	5.31E-11
22313.044	3.10E-12	1.75E-12	2.79E-12	7.90E-13	5.26E-11
22318.041	3.10E-12	1.75E-12	2.76E-12	8.06E-13	5.31E-11
22323.038	3.10E-12	1.74E-12	2.76E-12	7.90E-13	5.31E-11
22328.045	3.10E-12	1.75E-12	2.76E-12	7.59E-13	5.31E-11
22333.042	3.13E-12	1.75E-12	2.79E-12	8.06E-13	5.26E-11
22338.040	3.16E-12	1.78E-12	2.73E-12	7.83E-13	5.31E-11
22343.046	3.13E-12	1.72E-12	2.85E-12	7.75E-13	5.31E-11
22348.043	3.16E-12	1.74E-12	2.82E-12	8.29E-13	5.31E-11
22353.050	3.10E-12	1.74E-12	2.79E-12	8.29E-13	5.36E-11
22358.047	3.13E-12	1.80E-12	2.79E-12	7.83E-13	5.36E-11
22363.045	3.13E-12	1.75E-12	2.79E-12	8.22E-13	5.31E-11
22368.051	3.13E-12	1.80E-12	2.79E-12	7.90E-13	5.31E-11
22373.048	3.10E-12	1.78E-12	2.82E-12	7.98E-13	5.36E-11
22378.055	3.13E-12	1.80E-12	2.76E-12	8.22E-13	5.31E-11
22383.052	3.19E-12	1.80E-12	2.79E-12	7.90E-13	5.31E-11
22388.050	3.16E-12	1.78E-12	2.76E-12	7.83E-13	5.31E-11
22393.056	3.13E-12	1.77E-12	2.79E-12	8.37E-13	5.36E-11
22398.053	3.13E-12	1.86E-12	2.82E-12	8.06E-13	5.36E-11
22403.051	3.13E-12	1.77E-12	2.79E-12	8.29E-13	5.31E-11
22408.057	3.16E-12	1.75E-12	2.76E-12	8.37E-13	5.31E-11
22413.055	3.16E-12	1.75E-12	2.79E-12	8.29E-13	5.36E-11
22418.061	3.22E-12	1.80E-12	2.82E-12	8.29E-13	5.36E-11
22423.058	3.16E-12	1.81E-12	2.76E-12	8.29E-13	5.31E-11
22428.056	3.13E-12	1.81E-12	2.79E-12	8.29E-13	5.31E-11
22433.062	3.16E-12	1.77E-12	2.79E-12	8.14E-13	5.36E-11
22438.060	3.16E-12	1.80E-12	2.82E-12	8.22E-13	5.36E-11
22443.057	3.19E-12	1.80E-12	2.82E-12	8.14E-13	5.31E-11
22448.063	3.16E-12	1.83E-12	2.82E-12	8.22E-13	5.31E-11
22453.061	3.16E-12	1.81E-12	2.85E-12	7.98E-13	5.36E-11
22458.067	3.16E-12	1.77E-12	2.79E-12	8.06E-13	5.36E-11
22463.065	3.19E-12	1.75E-12	2.79E-12	8.14E-13	5.31E-11
22468.062	3.19E-12	1.80E-12	2.82E-12	8.22E-13	5.31E-11
22473.068	3.19E-12	1.81E-12	2.82E-12	8.06E-13	5.36E-11
22478.066	3.16E-12	1.78E-12	2.76E-12	8.06E-13	5.36E-11
22483.072	3.16E-12	1.78E-12	2.79E-12	8.22E-13	5.31E-11
22488.070	3.19E-12	1.83E-12	2.79E-12	7.90E-13	5.31E-11
22493.067	3.16E-12	1.83E-12	2.82E-12	8.14E-13	5.36E-11
22498.073	3.22E-12	1.78E-12	2.85E-12	7.75E-13	5.36E-11
22503.071	3.22E-12	1.80E-12	2.82E-12	8.06E-13	5.31E-11
22508.068	3.16E-12	1.78E-12	2.79E-12	8.06E-13	5.31E-11
22513.075	3.19E-12	1.83E-12	2.82E-12	7.90E-13	5.36E-11

DATA FROM PK35ORB

TIME	44	40	32	30	28
22518.072	3.19E-12	1.81E-12	2.85E-12	8.14E-13	5.36E-11
22523.078	3.19E-12	1.83E-12	2.79E-12	8.22E-13	5.31E-11
22528.076	3.26E-12	1.81E-12	2.85E-12	8.14E-13	5.31E-11
22533.073	3.19E-12	1.83E-12	2.82E-12	7.98E-13	5.36E-11
22538.079	3.19E-12	1.80E-12	2.79E-12	7.90E-13	5.36E-11
22543.077	3.19E-12	1.78E-12	2.82E-12	7.75E-13	5.31E-11
22548.074	3.19E-12	1.78E-12	2.82E-12	8.22E-13	5.31E-11
22553.081	3.16E-12	1.77E-12	2.79E-12	7.83E-13	5.36E-11
22558.078	3.16E-12	1.80E-12	2.79E-12	8.06E-13	5.36E-11
22563.084	3.22E-12	1.83E-12	2.82E-12	7.90E-13	5.31E-11
22568.082	3.19E-12	1.77E-12	2.79E-12	7.90E-13	5.31E-11
22573.079	3.19E-12	1.83E-12	2.79E-12	7.98E-13	5.36E-11
22578.086	3.19E-12	1.78E-12	2.85E-12	8.14E-13	5.36E-11
22583.083	3.22E-12	1.83E-12	2.76E-12	7.98E-13	5.31E-11
22588.081	3.19E-12	1.80E-12	2.82E-12	8.22E-13	5.31E-11
22593.087	3.22E-12	1.80E-12	2.79E-12	7.90E-13	5.36E-11
22598.084	3.22E-12	1.77E-12	2.76E-12	8.14E-13	5.36E-11
22603.091	3.22E-12	1.78E-12	2.79E-12	8.22E-13	5.31E-11
22608.088	3.22E-12	1.80E-12	2.82E-12	7.98E-13	5.31E-11
22613.086	3.22E-12	1.81E-12	2.82E-12	7.90E-13	5.36E-11
22618.092	3.19E-12	1.83E-12	2.79E-12	7.67E-13	5.36E-11
22623.089	3.19E-12	1.80E-12	2.76E-12	7.52E-13	5.31E-11
22628.096	3.19E-12	1.81E-12	2.82E-12	7.98E-13	5.31E-11
22633.093	3.16E-12	1.80E-12	2.85E-12	7.83E-13	5.36E-11
22638.091	3.22E-12	1.81E-12	2.79E-12	7.98E-13	5.31E-11
22643.097	3.19E-12	1.77E-12	2.82E-12	8.29E-13	5.31E-11
22648.094	3.19E-12	1.80E-12	2.82E-12	8.14E-13	5.31E-11
22653.092	3.13E-12	1.77E-12	2.76E-12	8.14E-13	5.31E-11
22658.098	3.19E-12	1.81E-12	2.73E-12	8.22E-13	5.31E-11
22663.096	3.13E-12	1.80E-12	2.79E-12	8.37E-13	5.31E-11
22668.102	3.13E-12	1.80E-12	2.73E-12	7.75E-13	5.26E-11
22673.099	3.10E-12	1.78E-12	2.79E-12	7.90E-13	5.21E-11
22678.097	3.13E-12	1.78E-12	2.79E-12	7.83E-13	5.26E-11
22683.103	3.13E-12	1.77E-12	2.79E-12	7.98E-13	5.26E-11
22688.101	3.19E-12	1.72E-12	2.82E-12	7.98E-13	5.31E-11
22693.098	3.16E-12	1.75E-12	2.76E-12	7.75E-13	5.21E-11
22698.104	3.13E-12	1.77E-12	2.79E-12	8.14E-13	5.26E-11
22703.102	3.13E-12	1.75E-12	2.82E-12	8.29E-13	5.26E-11
22708.108	3.10E-12	1.75E-12	2.79E-12	7.90E-13	5.31E-11
22713.106	3.16E-12	1.75E-12	1.00E-14	1.00E-14	1.00E-14

DATA FROM PK35ORB

TIME	22	20	18	16	14	12
21137.847	2.00E-13	4.20E-13	1.71E-11	3.35E-12	2.94E-12	4.32E-13
21142.853	2.00E-13	4.38E-13	1.71E-11	3.38E-12	2.91E-12	4.44E-13
21147.851	2.00E-13	4.26E-13	1.74E-11	3.32E-12	2.91E-12	4.50E-13
21152.848	1.88E-13	4.20E-13	1.71E-11	3.35E-12	2.94E-12	4.38E-13
21157.854	2.00E-13	4.32E-13	1.71E-11	3.32E-12	2.94E-12	4.38E-13
21162.852	1.94E-13	4.15E-13	3.55E-11	1.59E-13	1.94E-13	1.30E-13
21172.856	2.11E-13	4.09E-13	1.71E-11	3.29E-12	2.91E-12	4.38E-13
21177.853	2.00E-13	4.15E-13	1.71E-11	3.32E-12	2.91E-12	4.44E-13
21182.859	2.23E-13	4.09E-13	1.71E-11	5.21E-12	2.82E-12	4.32E-13
21187.857	2.00E-13	4.50E-13	1.74E-11	3.35E-12	2.94E-12	4.09E-13
21192.854	1.94E-13	4.20E-13	1.71E-11	3.32E-12	2.94E-12	4.32E-13
21197.860	1.82E-13	4.15E-13	1.71E-11	3.35E-12	2.94E-12	4.50E-13
21202.858	1.82E-13	4.03E-13	1.69E-11	3.32E-12	2.94E-12	4.15E-13
21207.864	1.88E-13	4.09E-13	1.71E-11	3.35E-12	2.91E-12	4.44E-13
21212.862	1.71E-13	4.09E-13	1.62E-11	3.60E-12	2.91E-12	4.15E-13
21217.859	1.82E-13	4.26E-13	1.71E-11	3.29E-12	2.91E-12	4.38E-13
21222.865	1.82E-13	3.97E-13	1.71E-11	3.32E-12	2.91E-12	4.26E-13
21227.863	2.00E-13	4.20E-13	1.69E-11	3.35E-12	2.94E-12	4.50E-13
21232.860	1.76E-13	4.38E-13	1.69E-11	3.32E-12	2.91E-12	4.26E-13
21237.867	1.94E-13	4.20E-13	1.69E-11	3.35E-12	2.91E-12	4.50E-13
21242.864	1.94E-13	4.15E-13	1.69E-11	4.46E-12	2.85E-12	4.61E-13
21247.870	1.88E-13	4.38E-13	1.69E-11	3.32E-12	2.91E-12	4.32E-13
21252.868	1.76E-13	4.20E-13	1.69E-11	3.29E-12	2.88E-12	4.50E-13
21257.865	1.94E-13	4.15E-13	1.69E-11	3.32E-12	2.91E-12	4.38E-13
21262.872	1.71E-13	3.86E-13	1.69E-11	3.26E-12	2.88E-12	4.32E-13
21267.869	1.94E-13	4.09E-13	1.69E-11	3.29E-12	2.91E-12	4.38E-13
21272.866	1.88E-13	3.86E-13	1.69E-11	3.32E-12	2.91E-12	4.44E-13
21277.873	1.94E-13	4.38E-13	1.69E-11	3.32E-12	2.91E-12	4.50E-13
21282.870	1.82E-13	4.32E-13	1.69E-11	3.32E-12	2.94E-12	4.20E-13
21287.876	2.11E-13	4.09E-13	1.69E-11	3.29E-12	2.88E-12	4.49E-13
21292.874	1.94E-13	3.80E-13	1.69E-11	3.29E-12	2.85E-12	4.26E-13
21297.871	1.94E-13	4.15E-13	1.69E-11	3.29E-12	2.91E-12	4.38E-13
21302.878	1.94E-13	4.15E-13	1.69E-11	3.97E-12	2.94E-12	4.15E-13
21307.875	1.76E-13	4.20E-13	1.69E-11	3.26E-12	2.91E-12	4.26E-13
21312.881	1.76E-13	4.26E-13	1.71E-11	3.29E-12	2.88E-12	4.20E-13
21317.879	1.94E-13	4.03E-13	1.69E-11	3.29E-12	2.91E-12	4.44E-13
21322.876	2.05E-13	4.15E-13	1.69E-11	3.35E-12	2.91E-12	4.32E-13
21327.883	1.82E-13	4.09E-13	1.69E-11	3.32E-12	2.91E-12	4.09E-13
21332.880	1.94E-13	3.97E-13	1.69E-11	3.26E-12	2.91E-12	4.32E-13
21337.877	1.59E-13	3.97E-13	1.69E-11	3.41E-12	3.01E-12	4.38E-13
21342.884	1.76E-13	4.15E-13	1.69E-11	3.32E-12	2.88E-12	4.32E-13
21347.881	1.88E-13	4.09E-13	1.69E-11	3.29E-12	2.94E-12	4.38E-13
21352.887	1.76E-13	4.03E-13	1.69E-11	3.29E-12	2.88E-12	4.20E-13
21357.885	1.94E-13	4.09E-13	1.69E-11	3.26E-12	2.91E-12	3.91E-13
21362.882	1.88E-13	4.15E-13	1.69E-11	3.29E-12	2.91E-12	4.20E-13
21367.889	1.94E-13	4.26E-13	1.66E-11	3.29E-12	2.91E-12	4.50E-13
21372.886	2.11E-13	4.32E-13	1.69E-11	3.26E-12	2.85E-12	4.26E-13
21377.883	1.94E-13	3.91E-13	1.69E-11	3.22E-12	2.88E-12	4.20E-13
21382.890	1.94E-13	4.26E-13	1.69E-11	3.32E-12	2.94E-12	4.38E-13
21387.887	2.05E-13	4.32E-13	1.66E-11	3.26E-12	2.88E-12	5.23E-13
21392.894	1.65E-13	3.97E-13	1.69E-11	3.29E-12	2.85E-12	4.32E-13
21397.891	2.00E-13	4.09E-13	1.69E-11	3.32E-12	2.91E-12	4.09E-13
21402.888	2.11E-13	4.38E-13	1.69E-11	3.26E-12	2.88E-12	4.20E-13
21407.895	1.71E-13	4.26E-13	1.66E-11	3.26E-12	2.91E-12	4.38E-13
21412.892	1.88E-13	4.15E-13	1.61E-11	3.04E-12	2.91E-12	4.32E-13

DATA FROM PK350RB

TIME	22	20	18	16	14	12
21417.898	2.05E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.38E-13
21422.896	1.82E-13	4.55E-13	1.69E-11	3.32E-12	2.94E-12	4.26E-13
21427.893	2.05E-13	4.09E-13	1.66E-11	3.32E-12	2.88E-12	4.55E-13
21432.900	1.82E-13	4.09E-13	1.69E-11	3.29E-12	2.91E-12	4.44E-13
21437.897	1.94E-13	4.32E-13	1.69E-11	3.29E-12	2.88E-12	4.32E-13
21442.895	1.88E-13	4.03E-13	1.69E-11	3.32E-12	2.88E-12	4.55E-13
21447.901	2.05E-13	4.09E-13	1.66E-11	3.29E-12	2.91E-12	4.50E-13
21452.898	2.00E-13	4.20E-13	1.69E-11	3.32E-12	2.88E-12	4.55E-13
21457.905	1.94E-13	4.20E-13	1.69E-11	3.32E-12	2.91E-12	4.55E-13
21462.902	1.88E-13	4.38E-13	1.69E-11	3.32E-12	2.91E-12	4.55E-13
21467.899	2.23E-13	4.15E-13	1.66E-11	3.32E-12	2.94E-12	4.44E-13
21472.906	2.00E-13	4.20E-13	1.69E-11	3.26E-12	2.88E-12	4.09E-13
21477.903	1.65E-13	4.15E-13	1.69E-11	3.29E-12	2.88E-12	4.15E-13
21482.901	2.23E-13	4.38E-13	1.69E-11	3.32E-12	2.91E-12	4.26E-13
21487.907	2.11E-13	4.32E-13	1.66E-11	3.32E-12	2.88E-12	4.44E-13
21492.904	1.94E-13	3.86E-13	1.69E-11	3.26E-12	2.88E-12	4.20E-13
21497.911	1.65E-13	4.09E-13	1.69E-11	3.29E-12	2.88E-12	4.03E-13
21502.908	1.94E-13	3.97E-13	1.69E-11	3.32E-12	2.85E-12	4.26E-13
21507.906	1.88E-13	4.32E-13	1.66E-11	3.29E-12	2.91E-12	4.20E-13
21512.912	1.65E-13	4.15E-13	1.69E-11	3.29E-12	2.85E-12	4.20E-13
21517.909	1.82E-13	4.38E-13	1.69E-11	3.32E-12	2.88E-12	4.50E-13
21522.907	2.11E-13	4.38E-13	1.66E-11	3.29E-12	2.98E-12	4.32E-13
21527.913	1.94E-13	4.26E-13	1.69E-11	3.26E-12	2.88E-12	4.44E-13
21532.910	1.82E-13	4.03E-13	1.69E-11	3.29E-12	2.88E-12	4.44E-13
21537.917	2.11E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.20E-13
21542.914	1.82E-13	4.32E-13	1.69E-11	3.29E-12	2.91E-12	4.09E-13
21547.912	1.94E-13	4.26E-13	1.66E-11	3.29E-12	2.98E-12	4.15E-13
21552.918	2.05E-13	3.97E-13	1.69E-11	3.29E-12	2.88E-12	4.32E-13
21557.915	1.88E-13	4.26E-13	1.69E-11	3.29E-12	2.91E-12	4.38E-13
21562.922	1.88E-13	4.26E-13	1.66E-11	3.26E-12	2.94E-12	4.15E-13
21567.919	1.94E-13	3.97E-13	1.66E-11	3.29E-12	2.91E-12	4.38E-13
21572.917	1.82E-13	3.97E-13	1.69E-11	3.26E-12	2.88E-12	4.32E-13
21577.923	2.05E-13	4.03E-13	1.69E-11	3.29E-12	2.91E-12	4.38E-13
21582.920	2.00E-13	4.09E-13	1.66E-11	3.29E-12	2.94E-12	4.44E-13
21587.918	1.82E-13	3.91E-13	1.66E-11	3.26E-12	2.88E-12	4.20E-13
21592.924	1.88E-13	4.15E-13	1.69E-11	3.26E-12	2.91E-12	4.26E-13
21597.922	2.05E-13	4.32E-13	1.69E-11	3.32E-12	2.88E-12	4.26E-13
21602.928	2.00E-13	4.06E-12	2.91E-12	1.41E-13	1.36E-13	1.24E-13
21607.925	1.88E-13	4.26E-13	1.66E-11	3.26E-12	2.94E-12	4.50E-13
21612.923	1.82E-13	3.91E-13	1.69E-11	3.26E-12	2.88E-12	4.32E-13
21617.929	1.76E-13	4.26E-13	1.69E-11	3.32E-12	2.85E-12	4.26E-13
21622.926	2.05E-13	4.15E-13	1.66E-11	3.26E-12	2.91E-12	4.38E-13
21627.924	1.94E-13	3.97E-13	1.66E-11	3.22E-12	2.88E-12	4.15E-13
21632.930	2.05E-13	4.03E-13	1.69E-11	3.29E-12	2.91E-12	4.49E-13
21637.928	1.88E-13	4.15E-13	1.69E-11	3.26E-12	2.88E-12	4.15E-13
21642.934	2.05E-13	3.91E-13	1.66E-11	3.29E-12	2.88E-12	3.97E-13
21647.931	1.71E-13	4.20E-13	1.66E-11	3.26E-12	2.91E-12	4.15E-13
21652.929	1.71E-13	4.03E-13	1.69E-11	3.29E-12	2.88E-12	4.20E-13
21657.935	1.70E-13	4.09E-13	1.69E-11	3.29E-12	2.88E-12	3.97E-13
21662.933	1.82E-13	4.09E-13	1.66E-11	3.29E-12	2.91E-12	4.03E-13
21667.939	2.05E-13	4.20E-13	1.66E-11	3.19E-12	2.85E-12	4.26E-13
21672.936	2.11E-13	4.15E-13	1.69E-11	3.26E-12	2.88E-12	4.38E-13
21677.934	1.65E-13	3.86E-13	1.69E-11	3.22E-12	2.85E-12	4.09E-13
21682.940	1.88E-13	3.91E-13	1.66E-11	3.26E-12	2.91E-12	4.44E-13
21687.938	1.76E-13	4.09E-13	1.66E-11	3.26E-12	2.94E-12	4.32E-13

DATA FROM PK350RB

TIME	22	20	18	16	14	12
21692.935	1.65E-13	4.03E-13	1.69E-11	3.26E-12	2.88E-12	4.26E-13
21697.941	1.76E-13	4.32E-13	1.69E-11	3.32E-12	2.91E-12	4.55E-13
21702.939	2.00E-13	4.03E-13	1.66E-11	3.26E-12	2.91E-12	4.15E-13
21707.945	1.76E-13	3.91E-13	1.66E-11	3.22E-12	2.91E-12	4.61E-13
21712.942	2.00E-13	3.97E-13	1.69E-11	3.32E-12	2.94E-12	3.74E-13
21717.940	2.05E-13	4.09E-13	1.69E-11	3.32E-12	2.91E-12	4.38E-13
21722.946	1.76E-13	4.09E-13	1.66E-11	3.29E-12	2.94E-12	4.38E-13
21727.944	1.76E-13	4.09E-13	1.66E-11	3.26E-12	2.88E-12	4.38E-13
21732.941	1.88E-13	4.32E-13	1.69E-11	3.29E-12	2.94E-12	4.38E-13
21737.947	2.11E-13	4.38E-13	1.69E-11	3.32E-12	2.91E-12	4.61E-13
21742.945	1.82E-13	3.91E-13	1.66E-11	3.29E-12	2.85E-12	4.15E-13
21747.951	1.94E-13	3.91E-13	1.66E-11	3.22E-12	2.88E-12	4.03E-13
21752.949	2.00E-13	3.97E-13	1.62E-11	3.07E-12	2.91E-12	4.32E-13
21757.946	1.82E-13	4.32E-13	1.69E-11	3.32E-12	2.98E-12	4.55E-13
21762.952	1.88E-13	4.15E-13	1.66E-11	3.26E-12	2.98E-12	4.26E-13
21767.950	1.65E-13	4.20E-13	1.62E-11	3.19E-12	2.91E-12	4.26E-13
21772.956	2.00E-13	4.44E-13	1.69E-11	3.32E-12	2.94E-12	4.32E-13
21777.954	1.76E-13	4.09E-13	1.69E-11	3.26E-12	2.85E-12	4.20E-13
21782.951	1.88E-13	4.09E-13	1.66E-11	3.29E-12	2.94E-12	4.20E-13
21787.957	1.65E-13	4.20E-13	1.69E-11	3.29E-12	2.88E-12	4.26E-13
21792.955	2.11E-13	4.26E-13	1.69E-11	3.29E-12	2.94E-12	4.32E-13
21797.952	1.94E-13	4.49E-13	1.69E-11	3.26E-12	2.91E-12	4.38E-13
21802.958	2.00E-13	3.16E-12	2.82E-12	1.30E-13	1.36E-13	1.41E-13
21807.956	1.59E-13	3.97E-13	1.69E-11	3.29E-12	2.88E-12	4.20E-13
21812.962	1.82E-13	4.15E-13	1.69E-11	3.32E-12	2.91E-12	3.97E-13
21817.960	2.17E-13	4.15E-13	1.69E-11	3.32E-12	2.98E-12	4.38E-13
21822.957	1.82E-13	4.20E-13	1.66E-11	3.29E-12	2.94E-12	4.26E-13
21827.963	1.82E-13	4.09E-13	1.66E-11	3.32E-12	2.94E-12	4.50E-13
21832.961	2.00E-13	4.09E-13	1.69E-11	3.29E-12	2.94E-12	4.26E-13
21837.958	1.71E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.09E-13
21842.965	1.76E-13	4.03E-13	1.66E-11	3.29E-12	2.98E-12	4.38E-13
21847.962	2.05E-13	4.32E-13	1.69E-11	3.29E-12	2.91E-12	4.32E-13
21852.968	1.88E-13	4.32E-13	1.69E-11	3.32E-12	2.91E-12	4.61E-13
21857.966	2.00E-13	4.32E-13	1.69E-11	3.35E-12	2.98E-12	4.32E-13
21862.963	1.82E-13	4.26E-13	1.66E-11	3.26E-12	2.88E-12	4.32E-13
21867.970	1.82E-13	4.20E-13	1.69E-11	3.32E-12	2.91E-12	3.97E-13
21872.967	1.94E-13	4.09E-13	1.69E-11	3.26E-12	2.94E-12	4.09E-13
21877.964	1.82E-13	4.09E-13	1.69E-11	3.29E-12	2.91E-12	4.26E-13
21882.971	1.82E-13	4.09E-13	1.66E-11	3.22E-12	2.94E-12	4.26E-13
21887.968	1.94E-13	3.86E-13	1.69E-11	3.29E-12	2.91E-12	4.32E-13
21892.975	1.88E-13	4.03E-13	1.69E-11	3.29E-12	2.94E-12	4.26E-13
21897.972	2.11E-13	3.80E-13	1.69E-11	3.32E-12	2.94E-12	3.97E-13
21902.969	1.76E-13	4.09E-13	1.66E-11	3.32E-12	2.98E-12	4.44E-13
21907.976	2.05E-13	4.26E-13	1.69E-11	3.29E-12	2.91E-12	4.38E-13
21912.973	2.00E-13	4.15E-13	1.71E-11	3.32E-12	2.94E-12	4.44E-13
21917.979	2.05E-13	4.15E-13	1.69E-11	3.26E-12	2.91E-12	3.91E-13
21922.977	2.23E-13	4.09E-13	1.66E-11	3.29E-12	2.94E-12	4.26E-13
21927.974	1.82E-13	4.44E-13	1.69E-11	3.22E-12	2.91E-12	4.61E-13
21932.981	1.82E-13	4.44E-13	1.69E-11	3.29E-12	2.88E-12	4.20E-13
21937.978	1.70E-13	4.15E-13	1.69E-11	3.32E-12	2.94E-12	4.32E-13
21942.976	1.94E-13	3.97E-13	1.66E-11	3.26E-12	2.94E-12	4.49E-13
21947.982	1.71E-13	4.15E-13	1.64E-11	3.19E-12	2.91E-12	4.03E-13
21952.979	1.71E-13	4.26E-13	1.69E-11	3.29E-12	2.91E-12	4.09E-13
21957.986	2.17E-13	4.44E-13	1.69E-11	3.32E-12	2.94E-12	4.38E-13
21962.983	1.82E-13	4.20E-13	1.66E-11	3.32E-12	2.94E-12	4.32E-13

DATA FROM PK35ORB

TIME	22	20	18	16	14	12
21967.980	1.88E-13	4.20E-13	1.69E-11	3.29E-12	2.94E-12	4.32E-13
21972.987	1.88E-13	4.20E-13	1.69E-11	3.26E-12	2.91E-12	4.09E-13
21977.984	1.94E-13	4.03E-13	1.69E-11	3.29E-12	2.94E-12	4.50E-13
21982.982	1.76E-13	4.20E-13	1.66E-11	3.29E-12	2.94E-12	4.32E-13
21987.988	1.94E-13	4.20E-13	1.69E-11	3.26E-12	2.88E-12	4.20E-13
21992.985	1.65E-13	4.55E-13	1.69E-11	3.26E-12	2.94E-12	4.32E-13
21997.992	2.00E-13	4.15E-13	1.69E-11	3.29E-12	2.94E-12	4.32E-13
22002.989	1.65E-13	3.97E-13	1.69E-11	3.26E-12	2.94E-12	4.32E-13
22007.987	1.76E-13	4.26E-13	1.69E-11	3.22E-12	2.88E-12	4.32E-13
22012.993	2.00E-13	4.20E-13	1.69E-11	3.29E-12	2.94E-12	4.50E-13
22017.990	2.00E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.09E-13
22022.997	1.94E-13	3.97E-13	1.66E-11	3.32E-12	3.01E-12	4.20E-13
22027.994	2.00E-13	4.15E-13	1.69E-11	3.29E-12	2.94E-12	4.50E-13
22032.992	1.76E-13	4.20E-13	1.69E-11	3.35E-12	2.91E-12	4.44E-13
22037.998	1.59E-13	4.15E-13	1.69E-11	3.29E-12	2.98E-12	4.26E-13
22042.995	1.71E-13	3.97E-13	1.66E-11	3.29E-12	2.91E-12	4.38E-13
22047.993	1.88E-13	4.09E-13	1.69E-11	3.26E-12	2.94E-12	4.20E-13
22052.999	1.53E-13	4.15E-13	1.69E-11	3.32E-12	2.94E-12	4.32E-13
22057.997	1.76E-13	4.20E-13	1.69E-11	3.32E-12	2.91E-12	4.26E-13
22063.003	1.76E-13	4.38E-13	1.66E-11	3.32E-12	2.94E-12	4.32E-13
22068.000	2.05E-13	4.44E-13	1.69E-11	3.29E-12	2.94E-12	4.38E-13
22072.998	1.88E-13	4.09E-13	1.69E-11	3.26E-12	2.91E-12	4.26E-13
22078.004	2.05E-13	4.44E-13	1.69E-11	3.32E-12	2.98E-12	4.15E-13
22083.001	2.17E-13	4.15E-13	1.66E-11	3.32E-12	2.91E-12	4.32E-13
22087.999	2.00E-13	4.50E-13	1.69E-11	3.29E-12	2.98E-12	4.20E-13
22093.005	1.94E-13	4.15E-13	1.69E-11	3.26E-12	2.91E-12	4.32E-13
22098.003	2.05E-13	4.32E-13	1.69E-11	3.35E-12	2.94E-12	4.38E-13
22103.009	1.71E-13	4.15E-13	1.69E-11	3.26E-12	2.88E-12	4.44E-13
22108.006	1.94E-13	4.44E-13	1.66E-11	3.26E-12	2.98E-12	4.44E-13
22113.004	1.88E-13	4.26E-13	1.69E-11	3.29E-12	2.91E-12	4.44E-13
22118.010	1.59E-13	4.26E-13	1.69E-11	3.32E-12	2.91E-12	4.38E-13
22123.008	1.82E-13	4.32E-13	1.66E-11	3.26E-12	2.94E-12	4.38E-13
22128.014	1.82E-13	4.15E-13	1.66E-11	3.26E-12	2.94E-12	4.32E-13
22133.011	2.05E-13	4.09E-13	1.69E-11	3.32E-12	2.91E-12	4.38E-13
22138.009	1.88E-13	4.15E-13	1.69E-11	3.32E-12	2.94E-12	4.55E-13
22143.015	1.82E-13	4.26E-13	1.69E-11	3.29E-12	2.94E-12	4.09E-13
22148.013	1.88E-13	4.09E-13	1.66E-11	3.29E-12	2.98E-12	4.38E-13
22153.010	2.11E-13	4.20E-13	1.69E-11	3.26E-12	2.85E-12	4.20E-13
22158.016	1.94E-13	4.20E-13	1.69E-11	3.35E-12	2.91E-12	4.32E-13
22163.014	1.94E-13	4.20E-13	1.69E-11	3.26E-12	2.91E-12	4.03E-13
22168.020	1.94E-13	3.97E-13	1.69E-11	3.32E-12	2.94E-12	4.20E-13
22173.018	2.05E-13	4.09E-13	1.69E-11	3.32E-12	2.91E-12	4.38E-13
22178.015	2.00E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.32E-13
22183.021	1.76E-13	4.20E-13	1.69E-11	3.32E-12	2.94E-12	4.20E-13
22188.019	1.88E-13	4.20E-13	1.69E-11	3.26E-12	2.88E-12	4.15E-13
22193.016	2.05E-13	4.15E-13	1.69E-11	3.26E-12	2.94E-12	4.55E-13
22198.023	1.65E-13	4.20E-13	1.69E-11	3.26E-12	2.91E-12	4.20E-13
22203.020	1.76E-13	4.09E-13	1.69E-11	3.29E-12	2.91E-12	4.32E-13
22208.026	1.94E-13	4.32E-13	1.69E-11	3.32E-12	2.98E-12	4.50E-13
22213.024	1.65E-13	4.03E-13	1.69E-11	3.29E-12	2.91E-12	4.38E-13
22218.021	1.94E-13	4.44E-13	1.69E-11	3.29E-12	2.91E-12	4.50E-13
22223.028	1.88E-13	4.03E-13	1.69E-11	3.32E-12	2.94E-12	4.38E-13
22228.025	1.82E-13	4.50E-13	1.69E-11	3.32E-12	2.91E-12	4.32E-13
22233.022	1.94E-13	4.15E-13	1.69E-11	3.32E-12	2.88E-12	4.50E-13
22238.029	2.11E-13	4.26E-13	1.69E-11	3.29E-12	2.94E-12	4.50E-13

DATA FROM PK35ORB

TIME	22	20	18	16	14	12
22243.026	1.94E-13	4.26E-13	1.69E-11	3.32E-12	2.98E-12	4.38E-13
22248.032	1.82E-13	4.09E-13	1.69E-11	3.29E-12	2.94E-12	4.32E-13
22253.030	2.17E-13	4.26E-13	1.69E-11	3.29E-12	2.94E-12	4.44E-13
22258.027	2.00E-13	4.20E-13	1.69E-11	3.32E-12	2.91E-12	4.32E-13
22263.034	2.05E-13	4.26E-13	1.69E-11	3.29E-12	2.94E-12	4.32E-13
22268.031	2.17E-13	4.03E-13	1.69E-11	3.32E-12	2.98E-12	4.50E-13
22273.037	2.05E-13	4.03E-13	1.69E-11	3.29E-12	2.94E-12	4.55E-13
22278.035	2.17E-13	4.15E-13	1.69E-11	3.29E-12	2.91E-12	4.49E-13
22283.032	1.94E-13	4.03E-13	1.69E-11	3.29E-12	2.91E-12	4.09E-13
22288.039	1.94E-13	4.09E-13	1.69E-11	3.29E-12	2.91E-12	4.44E-13
22293.036	1.76E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.03E-13
22298.034	1.94E-13	4.26E-13	1.69E-11	3.26E-12	2.91E-12	4.15E-13
22303.040	1.94E-13	4.44E-13	1.69E-11	3.29E-12	2.91E-12	4.32E-13
22308.037	1.94E-13	4.20E-13	1.69E-11	3.29E-12	2.94E-12	4.32E-13
22313.044	1.76E-13	3.97E-13	1.69E-11	3.26E-12	2.91E-12	4.15E-13
22318.041	1.82E-13	4.20E-13	1.69E-11	3.32E-12	2.91E-12	4.44E-13
22323.038	2.00E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.32E-13
22328.045	1.82E-13	4.03E-13	1.69E-11	3.29E-12	2.94E-12	4.15E-13
22333.042	1.71E-13	4.03E-13	1.66E-11	3.26E-12	2.91E-12	4.09E-13
22338.040	1.82E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.03E-13
22343.046	1.76E-13	4.15E-13	1.69E-11	3.32E-12	2.91E-12	4.26E-13
22348.043	2.05E-13	4.09E-13	1.69E-11	3.29E-12	2.98E-12	4.32E-13
22353.050	1.88E-13	3.91E-13	1.66E-11	3.29E-12	2.91E-12	4.44E-13
22358.047	1.76E-13	3.91E-13	1.69E-11	3.29E-12	2.91E-12	4.15E-13
22363.045	1.82E-13	4.26E-13	1.69E-11	3.32E-12	2.91E-12	4.38E-13
22368.051	2.05E-13	4.15E-13	1.69E-11	3.32E-12	2.88E-12	4.32E-13
22373.048	2.05E-13	4.09E-13	1.69E-11	3.26E-12	2.91E-12	4.44E-13
22378.055	1.82E-13	4.20E-13	1.69E-11	3.32E-12	2.91E-12	4.67E-13
22383.052	1.88E-13	4.50E-13	1.69E-11	3.32E-12	2.94E-12	4.32E-13
22388.050	1.76E-13	4.26E-13	1.69E-11	3.29E-12	2.91E-12	4.15E-13
22393.056	1.76E-13	4.15E-13	1.69E-11	3.26E-12	2.91E-12	4.50E-13
22398.053	1.94E-13	3.97E-13	1.69E-11	3.32E-12	2.88E-12	4.61E-13
22403.051	2.05E-13	4.09E-13	1.69E-11	3.32E-12	2.91E-12	4.32E-13
22408.057	2.11E-13	4.09E-13	1.69E-11	3.29E-12	2.94E-12	4.26E-13
22413.055	2.05E-13	4.09E-13	1.69E-11	3.29E-12	2.88E-12	4.44E-13
22418.061	2.17E-13	4.32E-13	1.69E-11	3.32E-12	2.88E-12	4.26E-13
22423.058	1.88E-13	4.20E-13	1.69E-11	3.32E-12	2.91E-12	4.09E-13
22428.056	1.88E-13	4.32E-13	1.69E-11	3.35E-12	2.91E-12	4.20E-13
22433.062	1.94E-13	4.15E-13	1.69E-11	3.29E-12	2.94E-12	4.50E-13
22438.060	1.94E-13	4.32E-13	1.66E-11	3.32E-12	2.94E-12	4.20E-13
22443.057	1.76E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.20E-13
22448.063	2.29E-13	4.38E-13	1.69E-11	3.29E-12	2.98E-12	4.38E-13
22453.061	1.71E-13	3.91E-13	1.66E-11	3.26E-12	2.88E-12	4.26E-13
22458.067	1.94E-13	4.15E-13	1.66E-11	3.29E-12	2.91E-12	4.20E-13
22463.065	1.82E-13	4.44E-13	1.69E-11	3.29E-12	2.91E-12	4.15E-13
22468.062	2.05E-13	4.32E-13	1.69E-11	3.32E-12	2.98E-12	4.26E-13
22473.068	1.94E-13	4.44E-13	1.66E-11	3.29E-12	2.91E-12	4.15E-13
22478.066	1.76E-13	4.20E-13	1.69E-11	3.32E-12	2.91E-12	4.09E-13
22483.072	1.76E-13	4.03E-13	1.69E-11	3.32E-12	2.98E-12	3.97E-13
22488.070	1.88E-13	4.15E-13	1.69E-11	3.29E-12	2.98E-12	4.09E-13
22493.067	2.11E-13	4.50E-13	1.69E-11	3.29E-12	2.91E-12	4.26E-13
22498.073	1.76E-13	4.44E-13	1.69E-11	3.29E-12	2.91E-12	4.44E-13
22503.071	1.76E-13	4.03E-13	1.69E-11	3.35E-12	2.94E-12	4.20E-13
22508.068	1.88E-13	4.03E-13	1.69E-11	3.32E-12	2.94E-12	4.26E-13
22513.075	1.76E-13	4.20E-13	1.66E-11	3.29E-12	2.88E-12	4.32E-13

DATA FROM PK35ORB

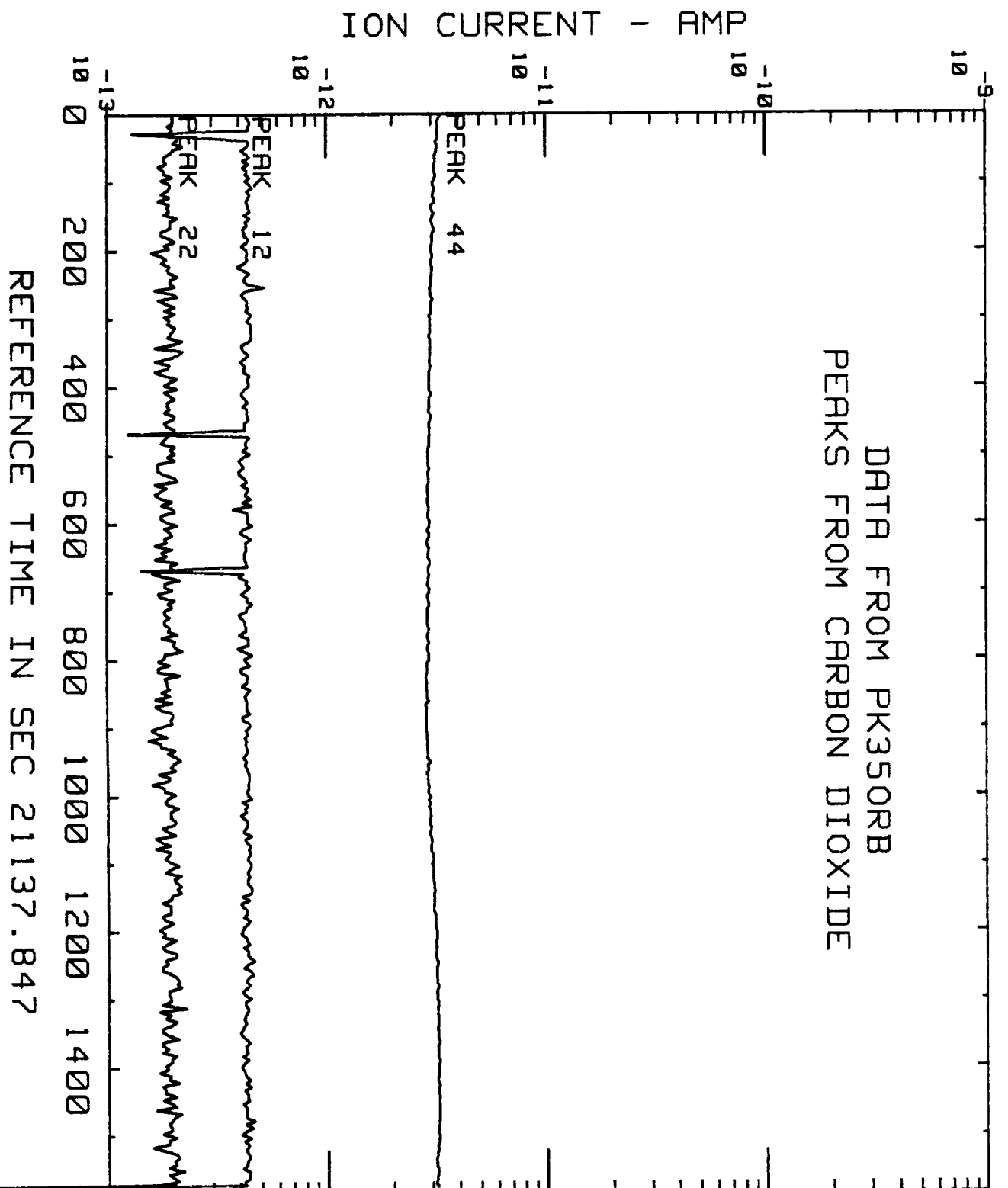
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22518.072	2.05E-13	4.38E-13	1.66E-11	3.32E-12	2.94E-12	4.09E-13
22523.078	1.94E-13	4.20E-13	1.69E-11	3.35E-12	2.98E-12	4.38E-13
22528.076	1.94E-13	4.32E-13	1.69E-11	3.32E-12	2.91E-12	4.15E-13
22533.073	1.82E-13	4.26E-13	1.69E-11	3.26E-12	2.91E-12	4.03E-13
22538.079	1.88E-13	4.32E-13	1.69E-11	3.29E-12	2.88E-12	4.15E-13
22543.077	1.71E-13	4.03E-13	1.69E-11	3.35E-12	2.94E-12	4.20E-13
22548.074	1.94E-13	4.44E-13	1.69E-11	3.32E-12	2.98E-12	4.26E-13
22553.081	1.88E-13	4.15E-13	1.66E-11	3.29E-12	2.88E-12	4.44E-13
22558.078	2.11E-13	4.09E-13	1.69E-11	3.29E-12	2.88E-12	4.20E-13
22563.084	1.76E-13	4.26E-13	1.69E-11	3.32E-12	2.94E-12	4.49E-13
22568.082	1.82E-13	4.09E-13	1.69E-11	3.35E-12	2.91E-12	4.15E-13
22573.079	1.82E-13	4.03E-13	1.69E-11	3.29E-12	2.88E-12	4.32E-13
22578.086	2.05E-13	4.32E-13	1.69E-11	3.29E-12	2.94E-12	4.32E-13
22583.083	1.76E-13	4.26E-13	1.69E-11	3.32E-12	2.94E-12	4.38E-13
22588.081	1.94E-13	4.38E-13	1.69E-11	3.26E-12	2.94E-12	4.09E-13
22593.087	2.05E-13	4.26E-13	1.66E-11	3.26E-12	2.88E-12	4.26E-13
22598.084	1.65E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.26E-13
22603.091	2.17E-13	4.44E-13	1.69E-11	3.35E-12	2.94E-12	4.26E-13
22608.088	2.00E-13	4.09E-13	1.69E-11	3.29E-12	2.91E-12	4.26E-13
22613.086	1.94E-13	4.32E-13	1.69E-11	3.32E-12	2.91E-12	4.67E-13
22618.092	1.88E-13	4.50E-13	1.69E-11	3.32E-12	2.88E-12	4.20E-13
22623.089	1.94E-13	4.15E-13	1.69E-11	3.32E-12	2.91E-12	4.55E-13
22628.096	1.94E-13	4.20E-13	1.69E-11	3.32E-12	2.91E-12	4.20E-13
22633.093	1.76E-13	4.03E-13	1.66E-11	3.29E-12	2.88E-12	4.03E-13
22638.091	2.05E-13	4.20E-13	1.69E-11	3.29E-12	2.91E-12	4.50E-13
22643.097	1.88E-13	4.09E-13	1.69E-11	3.32E-12	2.91E-12	4.15E-13
22648.094	1.88E-13	4.26E-13	1.69E-11	3.32E-12	2.94E-12	4.38E-13
22653.092	1.59E-13	4.03E-13	1.66E-11	3.29E-12	2.88E-12	4.26E-13
22658.098	1.82E-13	4.09E-13	1.66E-11	3.29E-12	2.91E-12	4.26E-13
22663.096	2.05E-13	4.44E-13	1.66E-11	3.29E-12	2.91E-12	4.38E-13
22668.102	2.11E-13	4.50E-13	1.69E-11	3.29E-12	2.94E-12	4.38E-13
22673.099	2.00E-13	4.15E-13	1.66E-11	3.29E-12	2.88E-12	4.26E-13
22678.097	2.05E-13	4.38E-13	1.66E-11	3.32E-12	2.91E-12	4.26E-13
22683.103	1.88E-13	4.38E-13	1.69E-11	3.29E-12	2.88E-12	4.09E-13
22688.101	2.23E-13	4.20E-13	1.66E-11	3.26E-12	2.94E-12	4.44E-13
22693.098	1.88E-13	4.20E-13	1.66E-11	3.29E-12	2.88E-12	4.38E-13
22698.104	2.00E-13	4.26E-13	1.66E-11	3.26E-12	2.91E-12	4.38E-13
22703.102	2.11E-13	4.26E-13	1.69E-11	3.32E-12	2.94E-12	4.15E-13
22708.108	1.71E-13	4.32E-13	1.69E-11	3.32E-12	2.91E-12	4.26E-13
22713.106	1.00E-14	1.00E-14	1.00E-14	1.00E-14	1.00E-14	1.00E-14

DATA FROM PK35ORB

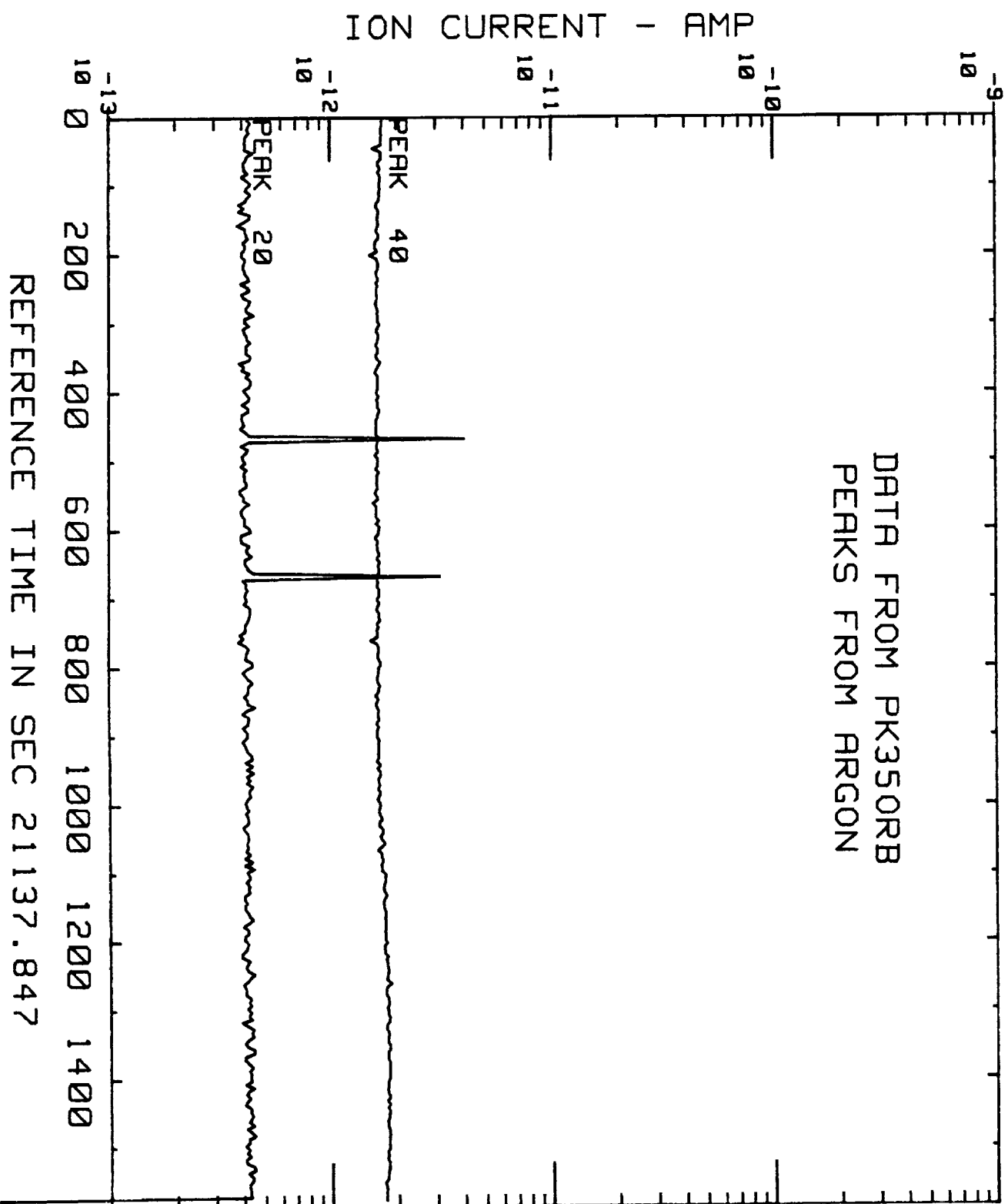
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21142.853	3.26E-12	1.71E-12	2.82E-12	8.22E-13	5.36E-11
21147.851	3.19E-12	1.72E-12	2.82E-12	8.14E-13	5.36E-11
21152.848	3.22E-12	1.71E-12	2.79E-12	8.29E-13	5.31E-11
21157.854	3.22E-12	1.69E-12	2.82E-12	8.29E-13	5.31E-11
21162.852	3.19E-12	1.72E-12	2.79E-12	8.06E-13	5.31E-11
21172.856	3.22E-12	1.69E-12	2.85E-12	8.22E-13	5.26E-11
21177.853	3.13E-12	1.71E-12	2.82E-12	8.06E-13	5.31E-11
21182.859	3.19E-12	1.55E-12	2.85E-12	7.52E-13	5.31E-11
21187.857	3.19E-12	1.71E-12	2.85E-12	7.75E-13	5.26E-11
21192.854	3.16E-12	1.69E-12	2.82E-12	8.14E-13	5.26E-11
21197.860	3.10E-12	1.71E-12	2.82E-12	7.90E-13	5.26E-11
21202.858	3.13E-12	1.64E-12	2.76E-12	7.67E-13	5.26E-11
21207.864	3.13E-12	1.66E-12	2.76E-12	8.06E-13	5.26E-11
21212.862	3.10E-12	1.69E-12	2.64E-12	7.90E-13	5.21E-11
21217.859	3.10E-12	1.64E-12	2.76E-12	7.98E-13	5.26E-11
21222.865	3.10E-12	1.69E-12	2.76E-12	8.29E-13	5.26E-11
21227.863	3.16E-12	1.69E-12	2.79E-12	8.29E-13	5.26E-11
21232.860	3.10E-12	1.67E-12	2.76E-12	8.06E-13	5.21E-11
21237.867	3.04E-12	1.67E-12	2.76E-12	8.22E-13	5.21E-11
21242.864	3.07E-12	1.69E-12	2.82E-12	7.98E-13	5.21E-11
21247.870	3.10E-12	1.66E-12	2.82E-12	7.75E-13	5.21E-11
21252.868	3.07E-12	1.67E-12	2.79E-12	7.83E-13	5.21E-11
21257.865	3.04E-12	1.66E-12	2.76E-12	8.06E-13	5.21E-11
21262.872	3.10E-12	1.61E-12	2.73E-12	7.83E-13	5.21E-11
21267.869	3.10E-12	1.61E-12	2.73E-12	7.90E-13	5.21E-11
21272.866	2.98E-12	1.66E-12	2.76E-12	7.90E-13	5.21E-11
21277.873	3.01E-12	1.66E-12	2.73E-12	7.90E-13	5.21E-11
21282.870	3.10E-12	1.63E-12	2.67E-12	7.44E-13	5.16E-11
21287.876	3.04E-12	1.64E-12	2.73E-12	7.83E-13	5.16E-11
21292.874	2.98E-12	1.66E-12	2.76E-12	7.98E-13	5.21E-11
21297.871	3.04E-12	1.63E-12	2.76E-12	7.90E-13	5.21E-11
21302.878	3.07E-12	1.61E-12	2.70E-12	8.14E-13	5.16E-11
21307.875	3.10E-12	1.66E-12	2.76E-12	7.90E-13	5.16E-11
21312.881	3.04E-12	1.66E-12	2.73E-12	7.75E-13	5.21E-11
21317.879	3.01E-12	1.60E-12	2.76E-12	7.83E-13	5.16E-11
21322.876	3.04E-12	1.60E-12	2.73E-12	7.75E-13	5.16E-11
21327.883	3.04E-12	1.60E-12	2.73E-12	7.75E-13	5.16E-11
21332.880	2.98E-12	1.64E-12	2.73E-12	7.83E-13	5.21E-11
21337.877	3.01E-12	1.50E-12	2.64E-12	8.06E-13	5.16E-11
21342.884	3.04E-12	1.63E-12	2.73E-12	7.67E-13	5.16E-11
21347.881	3.04E-12	1.64E-12	2.73E-12	8.06E-13	5.16E-11
21352.887	2.98E-12	1.66E-12	2.76E-12	8.14E-13	5.21E-11
21357.885	3.01E-12	1.64E-12	2.73E-12	7.36E-13	5.16E-11
21362.882	3.04E-12	1.61E-12	2.76E-12	7.90E-13	5.16E-11
21367.889	3.01E-12	1.63E-12	2.76E-12	7.83E-13	5.16E-11
21372.886	3.01E-12	1.66E-12	2.73E-12	8.22E-13	5.21E-11
21377.883	2.98E-12	1.61E-12	2.73E-12	7.90E-13	5.16E-11
21382.890	2.98E-12	1.64E-12	2.70E-12	7.90E-13	5.11E-11
21387.887	3.01E-12	1.61E-12	2.73E-12	8.06E-13	5.11E-11
21392.894	2.94E-12	1.63E-12	2.73E-12	7.36E-13	5.16E-11
21397.891	2.98E-12	1.63E-12	2.70E-12	7.67E-13	5.16E-11
21402.888	2.98E-12	1.63E-12	2.73E-12	8.22E-13	5.16E-11
21407.895	3.07E-12	1.60E-12	2.73E-12	7.75E-13	5.16E-11
21412.892	2.98E-12	1.63E-12	2.70E-12	7.75E-13	5.21E-11

1.0 On Orbit Data

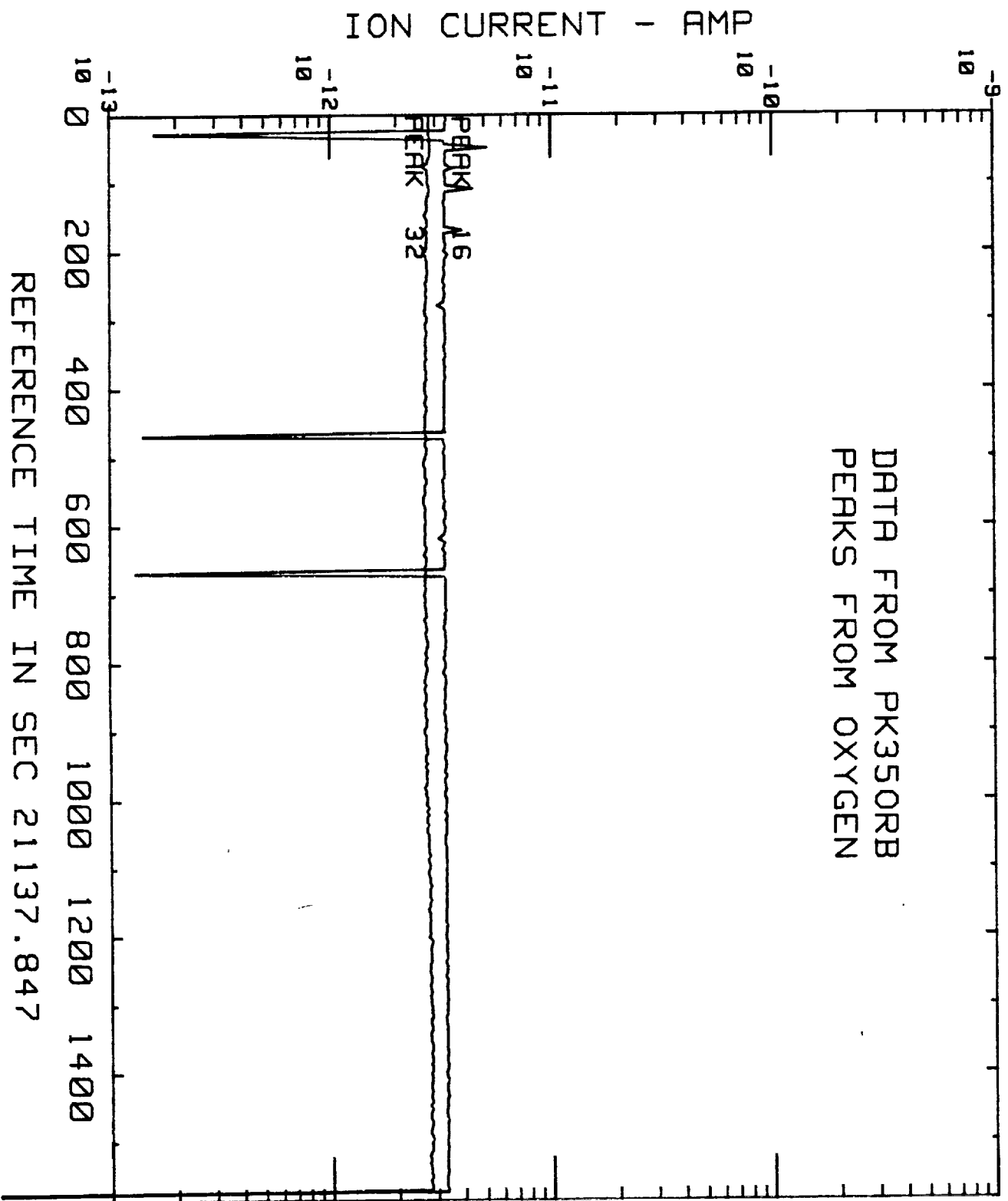
1.3 Plots of Peaks, Orbit

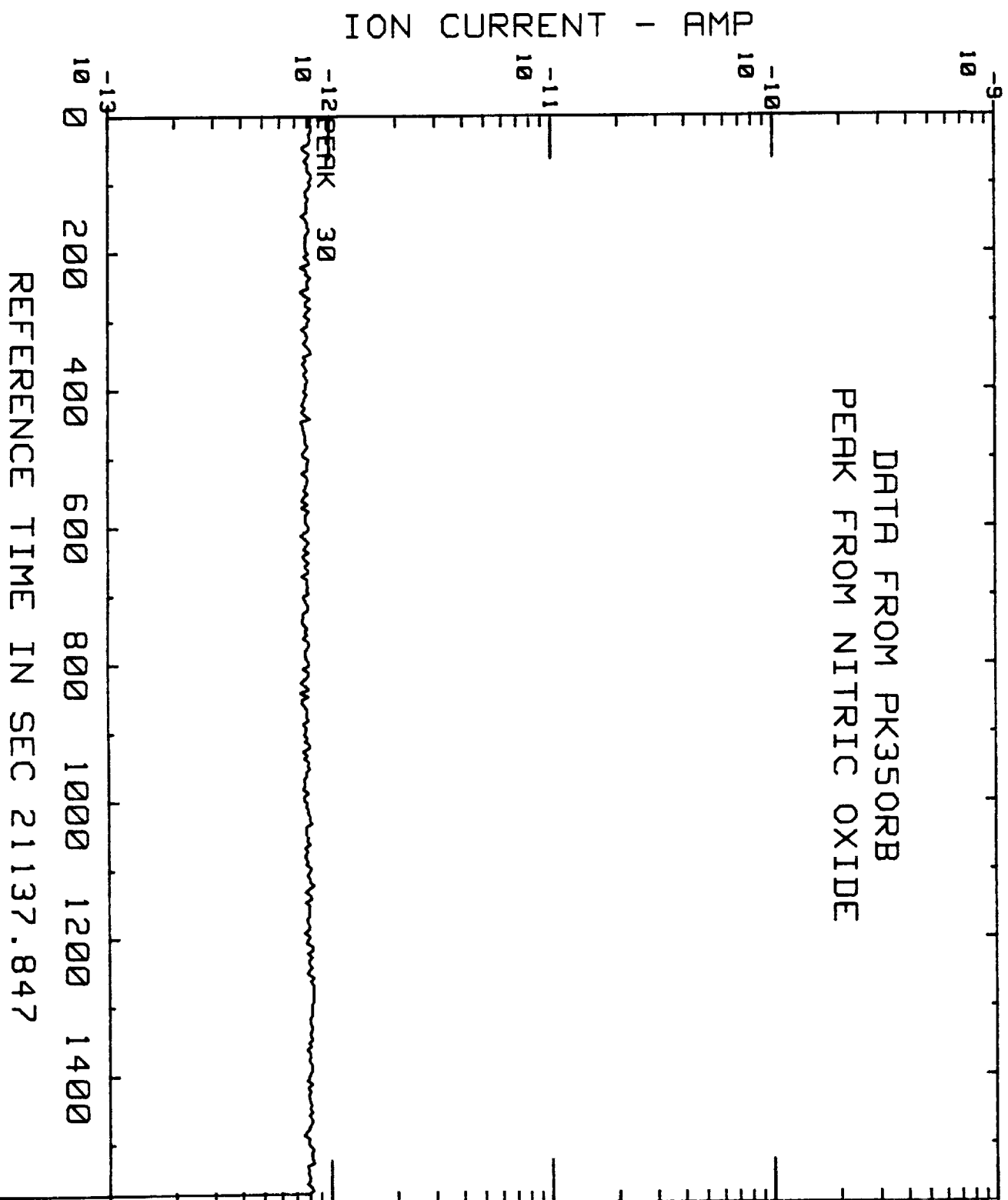


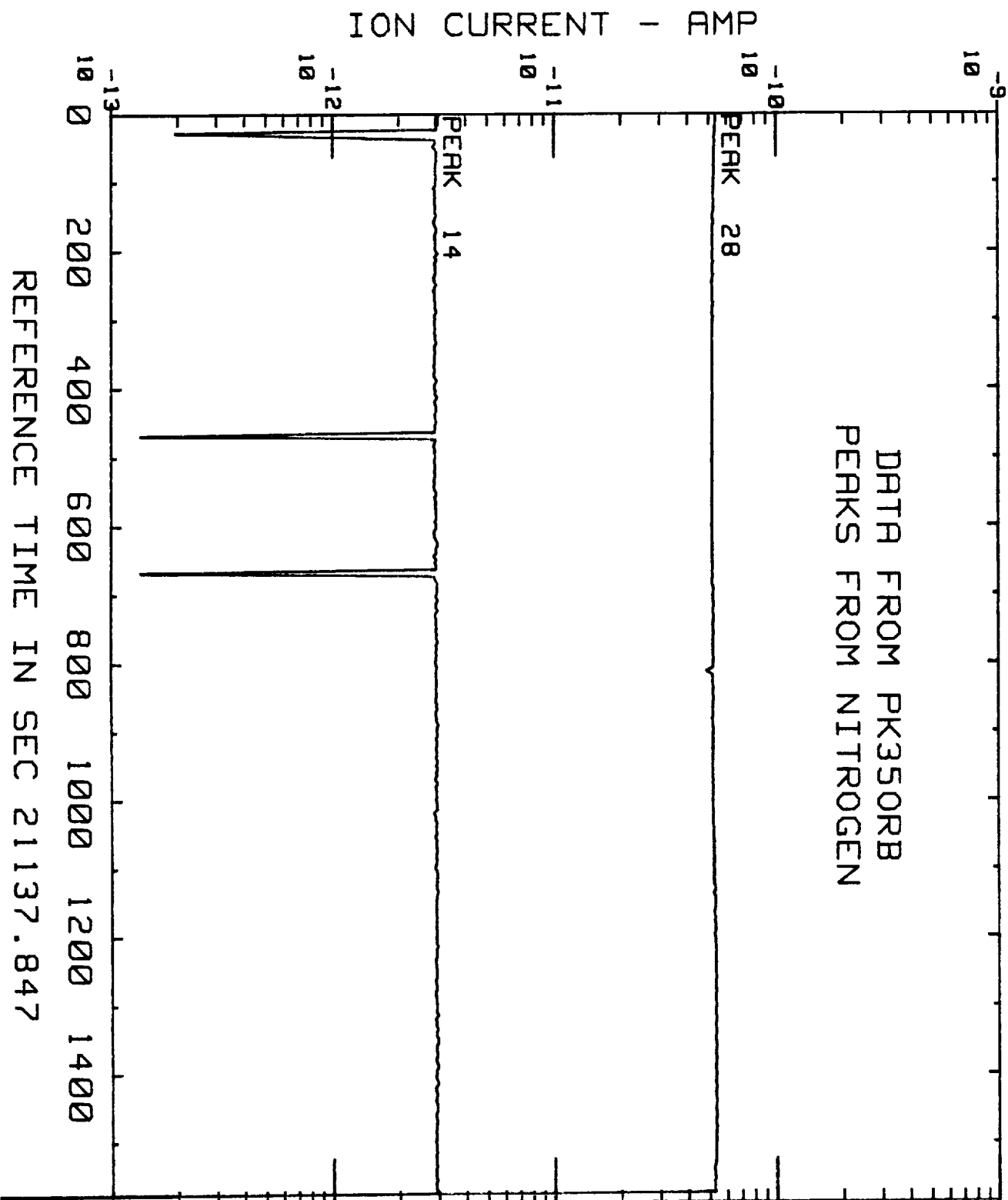
DATA FROM PK350RB
PEAKS FROM ARGON



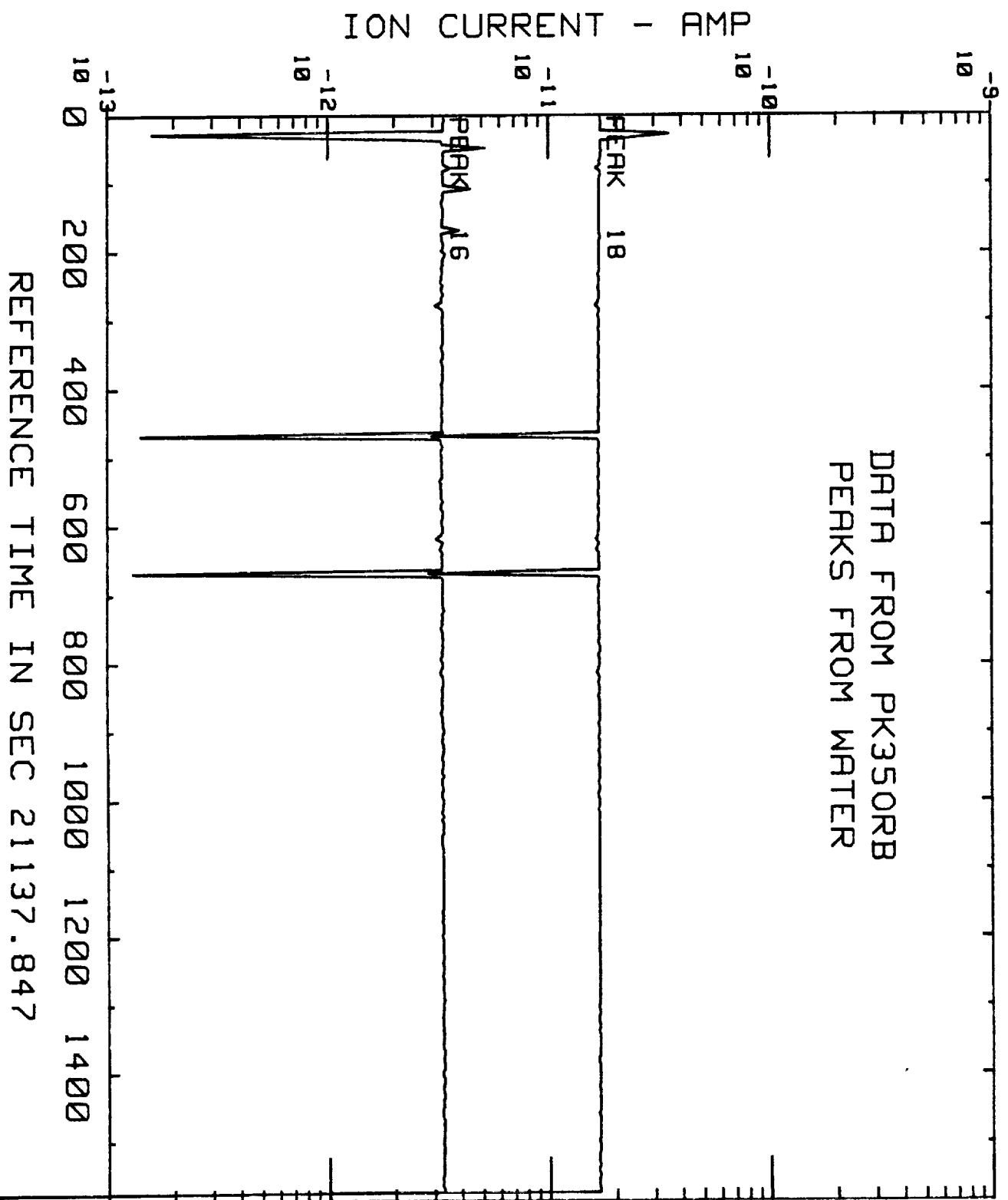
DATA FROM PK350RB
PEAKS FROM OXYGEN







DATA FROM PK350RB
PEAKS FROM WATER



1.0 On Orbit Data

1.4 Detail Test Objectives

CR 507
Attachment

DTO 0902 OEX SUMS (Shuttle Upper Atmosphere Mass Spectrometer)
(ID3/R. R. Richards)

PURPOSE/OBJECTIVE

The purpose of the SUMS experiment is to measure air density and identify atmospheric constituents in the upper atmosphere where free transitional flow phenomena predominate and where current analytical and experimental techniques are inadequate for accurately predicting vehicle flight performance. The information gathered will be used to calculate the aerodynamic force coefficients and derivatives in flight over the entry trajectory from free molecular flow to continuum flow (near vacuum of space to approximately 0.5 TORR external pressure, 275,000 ft.) and used to evaluate design predications.

SUPPORT REQUIREMENTS

- a. Unique Hardware:
 - 1. SUMS Installation
 - 2. ACIP/HIRAP Installation
 - 3. OEX System Control Module (SCM)
- b. Instrumentation:
 - 1. OEX Recorder: SUMS measurements

TEST CONDITIONS/ACTIVITY REQUIRED

- a. General Notes:

SUMS operations will be controlled by the SCM in response to uplink (real-time MDM or stored program commands) and by environmentally sensed commands.
- b. Prelaunch:
 - 1. Maintain vacuum in Mass Spectrometer -- COMMAND ON: SUMS VACUUM MAINTENANCE POWER ON (via MDM LF1).
 - 2. Between 4.5 hours and 4.0 minutes before launch, COMMAND OFF: SUMS VACUUM MAINTENANCE POWER OFF (All power to SUMS is OFF during launch). At approximately one hour before launch, the LF1 MDM must relinquish vacuum maintenance power control to the OEX SCM. This is to be accomplished by commanding SUMS VACUUM MAINTENANCE POWER OFF via the LF1 MDM. The SCM will then commence automatic control of

the vacuum maintenance power (at approximately T-20 minutes via MDM PFI.)

c. On-Orbit:

Note: While on orbit, two types of activities will occur: (1) a system "exercising" (no data) and (2) a data take during a maneuver, described below. There will also be a data take during entry, described below.

1. System Exercise - After orbit insertion (OI) plus any time within 2 hours, COMMAND ON: SUMS VACUUM MAINTENANCE POWER ON. After orbit insertion plus 20 hours, COMMAND ON: SUMS ION PUMP POWER ON. After approximately 30 minutes, COMMAND OFF: SUMS ION PUMP POWER OFF. (SUMS VACUUM MAINTENANCE POWER is to be maintained ON continuously). Repeat System Exercise every 12 hours thereafter.
2. Orbital Data Take - CRITICAL EXPERIMENT TIME: 1400 hours (± 8 minutes) local solar time, during any selected orbit. Systems warm-up required: At 2 hours prior to initiation of data take, COMMAND ON: SUMS ION PUMP POWER ON AND ~~SUMS INSTRUMENT POWER ON~~. At 30 minutes prior to data take: COMMAND ON: OEX ACIP POWER ON (this activates the HIRAP, the required instrument). *AT 1 MINUTE PRIOR TO*

Orientation - During the data take, there must be an orientation change from maximum drag through minimum drag (nose in direction of velocity vector) and back to maximum drag, involving a 200 degree pitch rotation with roll and yaw held to zero degrees plus or minus 10 degrees. The initial position for this rotation is orbiter +X axis at -110 degrees plus or minus 5 degrees with respect to the velocity vector (nose pointed to earth, +Z axis pointed toward velocity vector). The orientation change should be initiated by one thruster firing (with no subsequent firings during the maneuver) to acquire a reasonable constant rate between 0.1 deg/sec to 1.0 deg/sec. The final position is orbiter +X axis at +90 degrees plus or minus 5 degrees. Onboard activity should be held to a minimum and there should be no effluents. At the beginning of the DATA TAKE, COMMAND ON: OEX TAPE RECORDER POWER ON and OEX PCM POWER ON. Record approximately one (1) minute in the initial position and also one (1) minute in the final position. Then, COMMAND OFF: OEX TAPE RECORDER POWER OFF, OEX ACIP POWER OFF, OEX PCM POWER OFF, SUMS INSTRUMENTATION POWER OFF, SUMS ION PUMP POWER OFF (SUMS VACUUM MAINTENANCE POWER stays on). Repeat DATA TAKE if time permits.

d. Deorbit:

1. Entry Data Take - System warm-up required: 2 hours before deorbit burn, COMMAND ON: SUMS ION PUMP POWER ON and SUMS INSTRUMENT POWER ON. Then, 30 minutes before deorbit burn, COMMAND ON: OEX ACIP POWER ON. At 5 minutes before deorbit burn, COMMAND ON: OEX TAPE RECORDER POWER ON, and OEX PCM POWER ON (These latter two at least 30 seconds prior to first APU activation). Data take in effect until touchdown.

START OF THE MAINTENANCE POWER ON

e. Postlanding:

1. COMMAND OFF: SUMS ION PUMP OFF and SUMS INSTRUMENT POWER OFF.
2. Maintain COMMAND ON: SUMS VACUUM MAINTENANCE POWER ON whenever ships power available.

DATA REQUIREMENTS

- a. BET/MET (Best Estimate Trajectory/Meteorological Evaluation Tape). (M)
- b. SUMS, ACIP and HIRAP data recorded by the OEX recorder during the test periods. (M)
- c. Postlanding re-recording of OEX recorder SUMS data onto ground-based recorder. (M)

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<p>3. ABSTRACT (Maximum 200 words)</p> <p>The Shuttle Upper Atmosphere Mass Spectrometer (SUMS), a component experiment of the NASA Orbital Experiments Program (OEX), was flown aboard the shuttle Columbia (OV102) mounted at the forward end of the nose landing gear well with an atmospheric gas inlet system fitted to the lower fuselage (chin panel) surface. The SUMS was designed to provide atmospheric data in flow regimes inaccessible prior to the development of the Space Transportation System (STS).</p> <p>The experiment mission operation begins about 1 hour prior to shuttle de-orbit entry maneuver and continues until reaching 1.6 torr (about 86 km altitude). The SUMS flew a total of three missions, 1C, STS-35, and STS-40. Between flights, the SUMS was maintained in flight ready status at the Physics Laboratory of UTD. The flight data has been analyzed by the NASA LaRC Aerothermodynamics Branch. Flight data spectrum plots and reports are presented in the appendices to the Final Technical Report for NAS1-17399 as follows:</p> <p>Attachment A: Flight 61-C Report (Vol. 2) Attachment C: Flight STS-40 Report (Vol. 9) Attachment B: Flight STS-35 Report (Vol. 3, Vol. 4, Vol. 5, Vol. 6, Vol. 7, and Vol. 8) Attachment D: SUMS Software Listing (Vol. 9)</p>				
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